DOCUMENT RESUME

ED 450 242 CE 081 389

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TITLE The Value of the Output and Services Produced by Students While Enrolled in Job Corps.
INSTITUTION Mathematica Policy Research, Princeton, NJ.; Battelle Human Affairs Research Centers, Seattle, WA.; Decision Information Resources, Inc., Houston, TX.
SPONS AGENCY Employment and Training Administration (DOL), Washington, DC.
PUB DATE 1999-02-26
NOTE 115p.; For other National Job Corps Study documents, see ED 441 978, CE 081 130-131 and CE 081 387-388. MPR Reference No.: 8140-510.
CONTRACT K-4279-3-00-80-30
AVAILABLE FROM For full text: http://wdr.doleta.gov/opr/fulltext/99-jc_output.pdf.
PUB TYPE Reports - Evaluative (142)
EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Career Education; Comparative Analysis; *Cost Effectiveness; Disadvantaged Youth; Educational Attainment; Educational Research; *Employment Programs; Evaluation Criteria; Followup Studies; Job Skills; Measurement Techniques; Models; National Programs; National Surveys; Outcomes of Education; Participant Characteristics; Participation; *Productivity; Program Costs; Program Effectiveness; Program Evaluation; Research Design; Research Methodology; Skill Development; Statistical Analysis; *Student Projects; Success; Tables (Data); *Vocational Education; Work Experience Programs; Youth Employment; Youth Programs
IDENTIFIERS Impact Studies; *Job Corps; *National Job Corps Study; Return on Investment

ABSTRACT

The value of the output and services produced by students while enrolled in the Job Corps was estimated by analyzing data from a sample of 2 projects from each of 23 Job Corps centers. The projects were subjected to in-depth analysis based on independent-estimate and relative-productivity approaches. The following were among the key findings: (1) in 1 year, more than 1 million student-days are spent on all work projects in the Job Corps, with nearly 80% of student-days spent on vocational skills training (VST) projects and 20% spent on work experience (WE) projects; (2) students produce output worth $5.48 per hour spent on VST projects and $7.01 per hour spent on WE projects; (3) over 1 year, Job Corps students produce output worth more than $27 million while conducting non-center-serving projects, which is equivalent to $789 per student year; and (4) students working on center-serving projects reduce centers' operating costs by an estimated $280-$360 per student year, which is small when compared with the program operating costs of approximately $26,000 per student-year. (Twelve tables/figures are included. The following items are appended: a discussion of the weights used in the study; summaries of the work project studies; and standard errors of the estimates.) (MN)

Contract No.: K-4279-3-00-80-30
MPR Reference No.: 8140-510

THE VALUE OF THE OUTPUT AND SERVICES PRODUCED BY STUDENTS WHILE ENROLLED IN JOB CORPS

February 26, 1999

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ACKNOWLEDGMENTS

I would like to thank the many people who helped with this study. My greatest thanks go to the many Job Corps staff who took the time to talk with us and provide us with data on work projects. I would also like to thank the representatives of work experience sites who were interviewed for the study and local contractors who provided us with bids for the work projects.

Many researchers worked hard collecting data on work projects. These researchers included Alicia Meckstroth, Peter Schochet and Sheena McConnell from Mathematica Policy Research, Inc. (MPR), Mark Gritz, Jerald Herting, Terry Johnson, Jan Leonard, Carlyn Orians, Betsy Payn, and Susan Pearce from Battelle Human Affairs Research Centers (Battelle), and Russell Jackson and Carla Prince from Decision Information Resources, Inc. (DIR).

This report benefitted greatly from comments and suggestions made by colleagues, including John Burghardt, Walter Corson, and Peter Schochet at MPR, Terry Johnson and Mark Gritz from Battelle, and Russell Jackson from DIR. Noah Schenendorf provided excellent programming assistance. The report was skillfully edited by CarolAnn Stanger and produced by Felita Buckner.

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EXECUTIVE SUMMARY

The Job Corps program serves economically disadvantaged youths between the ages of 16 and 24 who can benefit from a wide range of education, vocational training, and support services in a predominantly residential setting. The National Job Corps Study, funded by the U.S. Department of Labor, was designed to provide a rigorous assessment of the effectiveness of the program. As part of that study, Mathematica Policy Research, Inc. (MPR) will conduct a benefit-cost analysis to assess whether the benefits of Job Corps justify the substantial investment of public resources in the program. Benefits of Job Corps include the increased employment and earnings, reduced criminal activity, and reduced use of other services and programs of youth who have participated in the program. In addition, the products or services students produce during their vocational training in Job Corps are benefits that should be included in the benefit-cost analysis. This report presents estimates of the value of these products and services.

An integral part of vocational training in Job Corps is the hands-on experience gained by students working on projects that involve producing a finished product or service. Depending on their trade, a student may participate in either vocational skills training (VST) projects or work experience (WE) projects. While the main purpose of both VST and WE projects is to train students, the products and services produced on these projects are valuable by-products of the training.

VST projects provide training to students primarily in construction trades. The projects typically involve repair and maintenance of facilities as well as remodeling and construction work. Most VST projects are performed on the buildings and grounds of Job Corps centers, although some are performed in community facilities. Students at nearly all stages of their training work on VST projects. Frequently, students from more than one trade work on the same project.

WE projects are used more in service-oriented trades such as clerical, health, and food-service occupations. After mastering a skill level in their trade, students work in real work settings. While some WE projects take place at the center, they are more typically located at public or private organizations in the community. Students can work up to six weeks in these unpaid positions.

Some VST and WE projects serve to reduce the operating costs of the center while providing students with training. These *center-serving* projects include such activities as general maintenance of the center or work in the center cafeteria or health clinic. Center-serving work projects reduce center operating costs, because students are performing work that would otherwise need to be paid for. Consequently, the benefits produced by these center-serving projects are captured through lower observed operating costs in the cost part of the benefit-cost analysis. To include them in the benefit part of the benefit-cost analysis would double count the benefits. For this reason, this study focuses on projects that contribute to the community and projects that lead to lasting improvements in the facilities or grounds of Job Corps centers, but not on projects that are center serving.

We estimate the value of output produced by students on work projects as the product of (1) the estimated number of days Job Corps students spend on these work projects and (2) the estimated average value of output created per day spent on the projects.

To estimate the number of hours spent on work projects, we collected data on time spent on work projects during 3-month periods from a random sample of 23 centers.

To calculate the value of output produced per hour spent on work projects, we conducted in-depth studies of a random sample of 44 non-center-serving projects that took place at the 23 centers. We valued the output using the supply price--the cost of obtaining the output from another supplier. Depending on the nature of the project, we estimated the supply price using either the independent-estimate approach or the relative-productivity approach. In the independent-estimate approach, we asked an alternative supplier, usually a professional contractor, how much they would charge to produce the same product as the students. In the relative-productivity approach, we estimated the cost of hiring someone else to do the work that the students performed.

Our main findings from the study follow:

- In one year, over one million student-days are spent on all work projects in Job Corps. This is equivalent to 31 (6-hour) days per student-year, where a student-year is equivalent to one student participating in Job Corps for one year. Nearly 80 percent of the student-days are spent on VST projects; just over 20 percent are spent on WE projects.

- Of the 31 days per student-year spent on work projects, about 21 days per student-year are spent on projects that are not center-serving (included explicitly in the benfit-cost analysis) and about 10 days per student-year are spent on center-serving projects (not included explicitly in benefit-cost analysis).

- On average, students produce output worth $39.00 per day or $6.50 per hour when working on non-center-serving work projects. The estimate of $6.50 per hour is consistent with other studies of output produced during training programs and is similar to the average compensation of students when they leave Job Corps ($5.98 plus fringe benefits).

- Students produce output worth $5.48 per hour spent on (non-center-serving) VST projects and $7.01 per hour spent on (non-center-serving) WE projects. The higher value of the output produced on WE projects is consistent with our expectations that students working on WE projects (who are near the end of their training) will have achieved higher skill levels than students working on VST projects (who may have just begun their training).

- Over one year, Job Corps students produce output worth over $27 million while conducting non-center-serving projects. This is equivalent to $789 per student-year. We estimate that students working on center-serving projects reduce the operating costs of the center between $280 and $360 per student-year. These amounts are small compared with the program operating costs of about $26,000 per student-year.

- Our estimates of the value of output are based on the supply price of the product or service produced by the students. However, for some projects, the supply price may overstate the value of the output. For example, if students did not produce the product or service free of charge, no-one may be willing to pay the supply price for it. Hence, our estimates of the value of output produced by students are upper-bound estimates.

I. INTRODUCTION

Since 1964, the Job Corps program has played a central part in federal efforts to provide employment assistance to disadvantaged youths. Job Corps provides a wide range of education, vocational training, and support services in a predominantly residential setting to economically disadvantaged youths between the ages of 16 and 24. Currently, 111 Job Corps centers operate nationwide, serving more than 60,000 new enrollees each year, at an annual cost of more than one billion dollars. Each Job Corps center provides training in a range of vocational trades, typically including business and clerical occupations, health occupations, food-service occupations, and several construction trades.

Much of the vocational training at Job Corps involves hands-on work. Students practice vocational skills by performing tasks they would do on the job. Some of these activities, such as laying a brick wall in the classroom and then knocking it down, produce no end product, their purpose is only to teach students skills. Other activities produce tangible products or services that someone uses. While the primary purpose of these projects is to train the students, the products and services the students produce are valuable by-products of their training. This report presents estimates of the value of these products or services.

The National Job Corps Study, funded by the U.S. Department of Labor (DOL), was designed to provide a rigorous assessment of the effectiveness of Job Corps.[1] It involves a study of the impact of the program on outcomes that include employment and earnings, use of educational and training programs, dependence on welfare and other assistance programs, family formation and childbearing,

[1]This study is being conducted by Mathematica Policy Research, Inc. (MPR) and its subcontractors, Battelle Human Affairs Research Centers and Decision Information Resources, Inc.

and antisocial behavior. It also involves a benefit-cost analysis and an analysis of how the Job Corps program model is implemented in practice.

The benefit-cost analysis will assess whether the benefits of Job Corps justify the substantial investment of public resources in the program. It will provide a framework for evaluating the many potential benefits and costs of the program, including those that cannot be measured in dollars. Expected benefits of Job Corps include the increased employment and earnings of youth who have participated in Job Corps, reduced criminal activity, and reduced use of other services and programs. The most important costs of Job Corps are the program operating costs and the earnings foregone while the student attends Job Corps.

The value of products or services students produce while at Job Corps are additional "benefits" of Job Corps. To assure a comprehensive assessment of benefits and costs, the value of these products or services will be included in estimating the benefits of the program. Including this output in the benefit-cost analysis ensures that work performed by Job Corps students is valued on the same basis as work performed by youth not enrolled in Job Corps. The training value of the activities will be captured in the benefit-cost analysis in estimates of the student's earnings after they leave Job Corps.

The next section describes the types of projects conducted by Job Corps students during vocational training. The chapter ends with a description of the organization of the report.

A. PROJECTS CONDUCTED BY STUDENTS DURING VOCATIONAL TRAINING

Job Corps centers provide two main types of training projects: Vocational Skills Training (VST) projects and Work Experience (WE) projects.

1. VST Projects

Job Corps defines VST projects as "activities that provide vocational instruction to students through actual construction or improvement of facilities or result in a finished product" (DOL 1993, PRH-4, page 11). VST projects play a central role in training students in the construction trades. The most common VST project involves work on center facilities. Students participate in remodeling and construction work at the center, including remodeling of classrooms and dormitories. Some remodeling projects are long-term and involve many students, while other VST projects are short-term and involve fewer students. Students may remodel a dormitory or build a book case as VST projects. Students may be involved in the repair and maintenance of the center, including such tasks as painting and landscaping. Some VST projects--referred to as community projects--take place off-center. Examples of these include remodeling community centers, building baseball dugouts for local schools, and constructing scaffolding for community festivals.

Students typically start work on a VST project soon after they join the vocational class and have completed safety training. Students with different levels of skills in a trade work on different parts of the project. A less advanced student may be assigned to work with a more advanced student or to a less technically-demanding task. Many VST projects involve students from different vocational trades. This provides the students with experience in coordinating their work with people from other trades-- an important skill for construction workers.

Each center prepares an annual plan for VST projects and submits the plan to its regional office for review. The annual VST plan describes the projects the center proposes to conduct in the year, the expected costs of the projects, the expected amount of training it will provide students in each trade, and the expected dollar value of the project.[2] The national office provides guidelines on how

[2]Projects that cost less than $2,500 can be grouped together under a "miscellaneous" category (continued...)

the centers should select projects (DOL 1993, PRH-4, page 13). The first priority is that the project provide training for the skills required for each vocational trade. The second priority is that the projects carry-out on-center construction, rehabilitation, and maintenance of the center.

Specifically designated VST funds cover most of the costs of VST projects including material costs, equipment rental, and subcontracted services. The center may also request capital construction/rehabilitation funds when the costs of the projects greatly exceed the amount of VST funds available. An outside agency typically pays most of the material and equipment costs of off-center VST projects.

2. WE Projects

The goal of the WE program is "to provide students an opportunity to perform in a real work setting where they will be able to utilize and enhance their skills in their respective training areas" (DOL 1993, PRH-4, page 26). WE projects or assignments are arranged with staff on-center or with public- or private-sector employers in the local community. They are primarily for students in trades other than the construction trades, but in some centers, building and apartment maintenance (BAM) students participate in WE assignments. On-center assignments may include working in the center's cafeteria, heath clinic, or administrative offices. Off-center WE assignments may include working as a nursing aide in a local nursing home, working as a receptionist at a local private company, or working in a local auto repair shop.

To be assigned to a WE project, students must have completed or nearly completed a level of their vocational training in the trade. They are often interviewed by the prospective "employer" before the assignment. Usually only one or two students work at the assignment at one time. Job

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[2](...continued)
in the plan.

Corps limits the amount of time the students can work at a WE assignment to 30 working days. Students are usually not paid for their work.

At the time of this study, centers were beginning to develop school-to-work (STW) projects where students work in the community earlier in their vocational training. Because STW projects comprised fewer than 3 percent of projects and were similar to WE projects in many respects, we treated them as WE projects in this study.

B. ORGANIZATION OF THE REPORT

The second chapter of this report outlines the methodology we used to estimate the value of the output of work projects, including a description of the sampling of the projects and the approaches we used to estimate the value of the projects. The third chapter presents the findings from the study and discusses the sensitivity of the results to alternative assumptions. Appendix A discusses the weights used in the analysis, Appendix B describes each project studied in detail, and Appendix C presents the standard errors of our estimates.

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II. METHODOLOGY

The purpose of this study is to estimate the value of the output produced by students during work projects.[1] Our basic approach to estimating this value is summarized in Figure II.1. There are two main components to our estimate: (1) the number of days Job Corps students spend on work projects and (2) the value of the output created each day students spend on work projects. To estimate the amount of time spent on work projects, we asked 23 centers to provide information on work projects that students worked on in a three-month period. To estimate the value of output created each day students spend on work projects, we conducted in-depth studies of 46 individual work projects.

This chapter describes in detail the methodology of the study. We begin in Section A by discussing the work projects included in the study. Section B discusses our approach to sampling centers and work projects. Section C describes our approach to estimating the amount of time spent by Job Corps students on work projects. Section D describes our approaches to estimating the value of the output produced each day spent on work projects. We conclude the chapter with a discussion of how the estimate obtained in this study will be incorporated into the cost-benefit analysis.

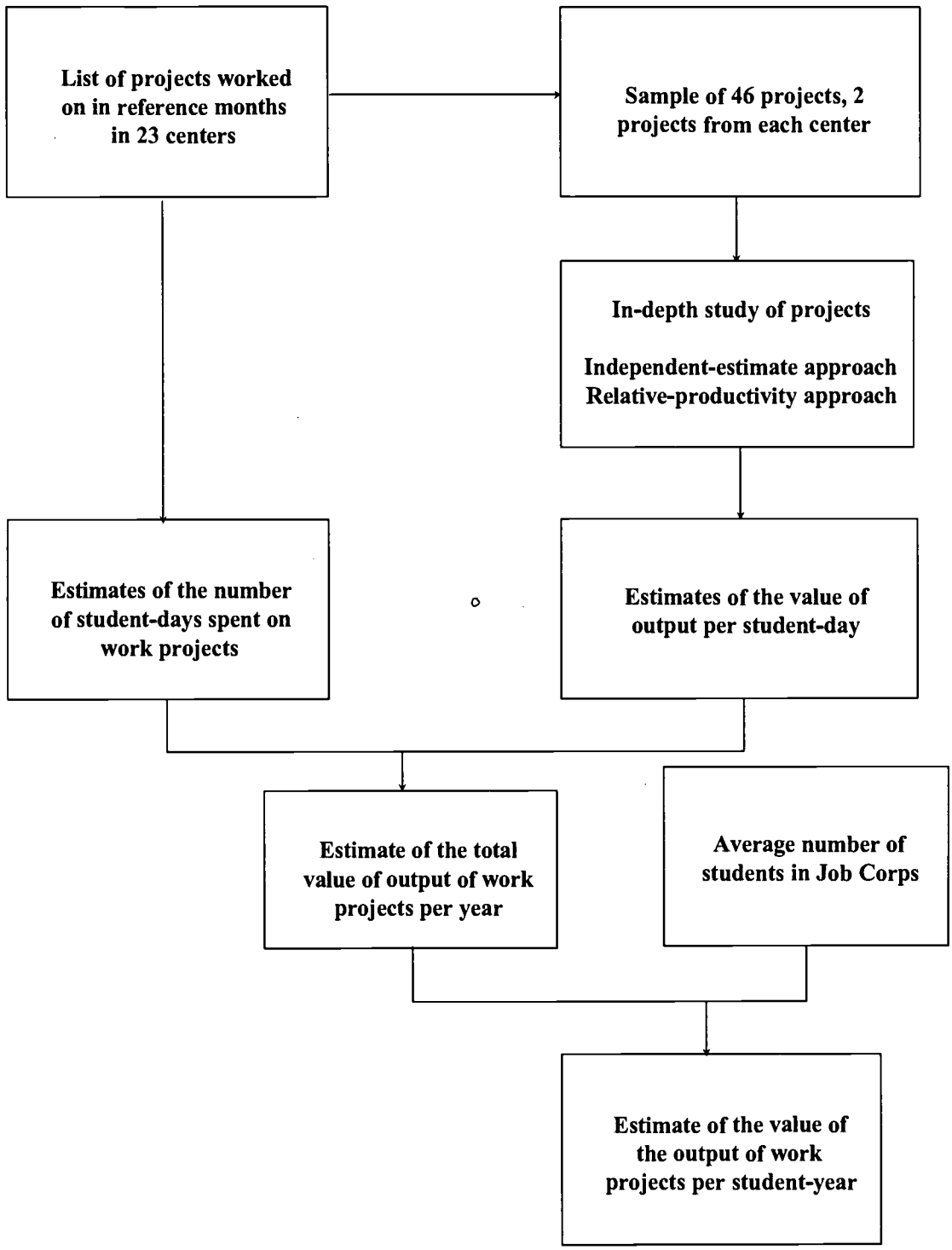
A. WORK PROJECTS INCLUDED IN THE STUDY

As described in the previous chapter, students conduct a wide range of work projects. During some work projects, students conduct work on the center that contributes to the day-to-day operation of the center. For example, students may work in the center's administrative office, cafeteria, or health center or conduct routine painting or other maintenance work on center facilities. We refer

[1]For convenience, this report uses the term "work project" to refer to either a VST, WE, or STW project. This term is not typically used by Job Corps staff.

FIGURE II.1

OVERVIEW OF STUDY METHODOLOGY



to these projects as "center serving." We do not include in our definition of center-serving projects that lead to lasting improvements in center facilities, such as remodeling work. By definition, no off-center project is considered to be center-serving.

Center-serving projects reduce center operating costs, because students are performing work that would otherwise need to be paid for. Hence, in our benefit-cost accounting framework, the value of these center-serving projects is captured in the cost part of the benefit-cost analysis--observed center operating costs will be lower than they would be if students did not perform the center-serving work projects. Consequently, we will not include the value of center-serving projects in the benefit part of the benefit-cost analysis. To do so would double count the benefits. Because we do not need to estimate the value of the output of center-serving projects for the benefit-cost analysis, this study focuses mainly on projects that are not center-serving.

B. THE SAMPLING APPROACH

Sampling for the study occurred in three stages. First, we selected 23 centers. Second, for each center, we selected three recent months that would serve as *reference months* for the study. Third, we selected two projects at each center. To estimate the value of output produced in all Job Corps and not just the sampled projects, we developed weights for each center and project. Appendix A describes the construction of those weights.

1. Selecting Centers

The sample frame for the selection of centers reflected the sample frame for the impact analysis. It consisted of 103 centers operating in program year 95 (July 1995 to June 1996) that were located in the contiguous 48 states. We excluded seven programs that were excluded from the impact analysis because they differed from the regular Job Corps program in their funding, admission

criteria, referral process, or services they provide. In addition, we excluded three centers from the frame because there was major construction scheduled for the time of the site visit.

From this frame, we randomly selected 23 centers through systematic stratified sampling.[2] The centers were divided into three strata: (1) Civilian Conservation Centers (CCCs), (2) contract centers with at least 20 percent of their slots for nonresidential students, and (3) contract centers that are predominantly residential (less than 20 percent of their slots are for nonresidential students).[3] Within the first and third strata, we listed the centers by the agency that operated the center. Within the second strata, we listed the centers by region. Centers were then randomly sampled from each strata with the probability of selection proportional to the number of slots at the center. Five centers were selected from each of the first two strata, and 13 centers were selected from the third strata.

2. Selecting the Reference Months

Because of the seasonal variation in work projects, we chose to conduct the study throughout a one-year period. We randomly assigned each of the 23 centers to a quarter within 1996, each quarter assigned to a center with a probability of one-quarter. We planned to visit all the sampled centers in the assigned quarter within this one-year period.[4] The three full months preceding the month during which we first contacted the center to discuss the study were chosen as the reference

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[2]Systematic sampling consists of taking every n^{th} sampling unit after a random start. The sample reflects whatever stratification exists in the ordering of the population list (Kish 1965).

[3]CCCs are operated by the U.S. Departments of Agriculture and Interior. Contract centers are operated by private contractors.

[4]Because of scheduling problems, the visits were actually completed within a 13-month period.

months.[5] Choosing recent reference months maximized the ability of center staff to provide accurate information about the work projects.

3. Selecting Projects

We asked the 23 sampled centers to provide a list of all the work projects (either VST, WE, or STW projects) students had worked on during the reference months. We excluded from the list all center-serving projects. We determined whether the project was center-serving based on the description of the project provided by the centers, the VST plans centers sent to the regional office, and discussions with the VST coordinator at the center.[6]

We asked the centers to provide information on each project on the list, including the average number of students who worked on each project during the reference months, the average number of days each student worked on the project, and the average number of hours students worked on the project each day. This information was used to estimate the total number of student-days spent on each project, where a student-day is equivalent to one student working six hours on a project.[7]

We selected two projects from the list of projects obtained from each center. The two projects for study at each center were chosen using systematic random sampling, with the probability of

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[5]Because the first contacts with the centers were made at slightly different times within each quarter, the reference months differ slightly even between centers visited in the same quarter.

[6]If the project led to lasting improvements in the center facilities or grounds as well as reduced operating costs, we divided the project into two parts--the part that led to lasting improvements was included in the sample frame, and the part that reduced operating costs was excluded from the frame. This only occurred when more than one project was worked on in the reference months under one "miscellaneous" project title. For example, a miscellaneous on-center project may include painting the center (reducing the operating costs of the center) and also constructing a bookcase (a lasting improvement).

[7]The number of student-days worked on a project was calculated by multiplying the number of students who worked on the project by the number of days worked per student by the number of hours worked on the project per day, and dividing by six.

selection proportional to the number of student-days spent on the project in the reference months.[8] Prior to sampling, the projects were ordered by whether they were VST, WE, or STW projects. We chose projects with probability proportional to the number of days spent on the project instead of equal probability for statistical efficiency. Using this sampling approach, we avoided selecting a large number of small projects that represented only a small fraction of the number of student-days spent on projects.

C. NUMBER OF STUDENT-DAYS SPENT ON WORK PROJECTS

Using the information provided by the centers, we estimated the number of student-days spent on all work projects conducted in each of the sampled centers during the three reference months. Using center weights, we estimated the total number of student-days spent on work projects in all centers in Job Corps in one year.

D. VALUE OF OUTPUT PRODUCED PER STUDENT-DAY

To estimate the value of output produced per student-day, we conducted studies of 46 work projects during site visits to the centers. Site visits occurred between January 1996 and January 1997. The studies were conducted by trained researchers using detailed protocols (McConnell 1996). Our estimates are based on 44 projects--at one center we were unable to complete studies of the two projects.

The appropriate measure of the value of the output produced by the Job Corps students is the amount society is willing to pay for the output. This is unobservable. However, under certain assumptions, the price of the output is a good measure of society's willingness to pay. Since the

[8]We also chose a backup project for each center using the same sampling scheme. We studied the backup project rather than the chosen project in five cases. In each of these five cases, we encountered practical difficulties in conducting the initially chosen project, such as the unavailability of the representative of a WE site.

product of the work projects is usually not sold, we valued the output of the projects using the supply price--the cost of obtaining the output or service from another supplier. This supply-price approach is the most common approach used to value the output produced by participants in Job Corps and other training and employment programs (Zimmerman and Masters 1978; Long 1979; Kemper and Long 1981; and Long, Thornton, and Whitebread 1983).

The advantage of estimating the value of output using the supply-price approach is that the estimates are based on relatively easy-to-measure concepts. However, it is based on assumptions that may not hold in some circumstances. These assumptions include the following:

- ***Someone would be willing to buy the students' output at the supply price.*** As the output of Job Corps students is rarely sold, we cannot observe whether this is the case. If no one is willing to pay the supply price, the value of the output would be lower than the supply price.

- ***Job Corps students do not displace other workers.*** Job Corps explicitly prohibits work projects in which students displace other workers. However, if Job Corps students do displace other workers who are unemployed, the reduction in output of the unemployed workers should be offset against the increase in output of the students. In this case, the value of the output would be less than the supply price.

- ***All benefits and costs are reflected in the supply price.*** Some benefits or costs may not be captured by the supply price if they accrue to persons other than the seller or purchaser of the product. Economists refer to these benefits and costs as externalities. An example of an externality would be the benefits that accrue to the general residents of a community when students paint the exterior of a privately-owned building. If the externality is a benefit (cost), the supply price will understate (overstate) the value of the output.

- ***The students' output is of similar quality to that of a professional worker.*** If the output or service produced by the student is of lower quality than that produced by a professional worker, the supply price will overstate the value of the output.

As part of each work-project study, researchers evaluated these assumptions.

The centers provide an estimate of the appraised value of the projects when they submit VST plans to the regional office. We chose not to use this to measure value because of concerns about

its accuracy. Job Corps staff are not expected to spend much time or resources estimating this value. To arrive at the figure, VST coordinators used basic rules-of-thumb (such as multiplying materials costs by three) or made a guess based on their experience in the construction trades.

Based on the nature of the work project, we selected one of two different approaches to estimate the supply price of the output: (1) the independent-estimate approach and (2) the relative-productivity approach. The independent-estimate approach involves asking a contractor how much they would charge for the output produced by the students. The relative-productivity approach involves estimating the cost of hiring professional workers to do the same work as the students, and adjusting for differences between the students and the professional workers in productivity, use of materials, and supervision requirements.

1. Independent-Estimate Approach

The independent-estimate approach measures the supply price by determining what an alternative supplier (usually a professional contractor) would charge to do the same work. It was used when the students made a well-defined product. This approach was particularly useful when students from many different trades worked on a project. It was used to estimate the value of output of 30 VST projects. Only two VST projects were not valued using this approach.[9]

The independent-estimate approach involves four basic steps: (1) defining the product of the project to value, (2) obtaining an alternative supplier's estimate for the product, (3) obtaining an estimate of the costs (other than the cost of student labor) incurred in producing this product as a work project, and (4) estimating the number of student-hours spent producing the product. The

[9]One project was valued using both the independent-estimate and relative-productivity approach. This project was a "miscellaneous" project under which two smaller projects were worked on during the reference months. One of these smaller projects was valued using the independent-estimate approach and one was valued using the relative-productivity approach.

difference between an alternative supplier's charge for this product and the amount spent on the product provides an estimate of the value added by the students. An estimate of the value of output per student-hour was obtained by dividing the estimate of the value added by the number of student-hours spent producing the product. An estimate of the value added per student-day was obtained by multiplying the per student-hour estimate by six.

a. Defining the Product to be Valued

Ideally, we would have valued the product produced by the students during the three reference months. However, we found that most projects either began before the reference months and/or were still in progress at the end of the reference months. Out of 30 projects to which we applied the independent-estimate approach, 25 either began before and/or ended after the reference months.[10] In these cases, it is very difficult to identify the product produced by the students during the reference months. Even if we could identify the partial product produced during the reference months, it was difficult for a contractor to give a bid on a partial project and the center to identify the materials costs of the partial product. Instead, we selected products to value that could be easily understood by a contractor and for which we could obtain data on costs and student-hours spent on the producing the product, even if some of the work was conducted outside the reference months or we did not value all the work conducted during the reference months. We then assumed that the productivity of the students was the same during the reference months as it was before and after the reference months.

[10]Of these 25 projects, 3 projects began before the reference months and ended during the reference months, 3 projects began during the reference months and ended after the reference months, and 19 projects started before the reference months and were still in progress at the end of the reference months.

b. Estimate of the Amount Charged for the Product by an Alternative Supplier

We arranged for a professional contractor to bid on the product produced by the student. The contractor was a company or person that the VST coordinator would be comfortable recommending for work done on the center. In some cases, the contractor had already done work on the center.[11] The contractor visited the work site, reviewed blueprints and other specifications for the work done by the students, and talked with the VST coordinator, vocational instructors, and researchers to clarify the work. The contractor then drew up a detailed bid for the work that included overhead costs and profits. The bid was sent directly to us. We paid the contractors for their time. We were forced to drop two studies of VST projects from our sample (both at the same center) because a contractor who agreed to provide us with bids failed to do so.

c. Costs of Producing the Product

The center provided us with data on the costs of the project. The centers we visited kept good records of the amount of funds expended on VST projects. In a few cases, the centers used donated materials for the project, so we estimated the market value of the donated goods. It was more difficult to obtain the costs of off-center VST projects, none of which were paid for by Job Corps. We used the estimate of material costs provided by the contractor for one off-center project because we were unable to obtain the costs of the materials from a representative of the project site. In some cases, the VST costs for materials were less than contractor's estimates. Explanations given to us for these differences were that contractors mark up material costs and VST staff often buy in bulk and have good relations with suppliers.

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[11]In one VST project, the students made patio furniture. In the absence of VST projects, the center would have bought the furniture from a store. Instead of obtaining a bid from a contractor, we obtained the prices of the furniture from a store. For another project, no contractor in the area could give us an estimate. So we took detailed specifications of the work done by the students to a contractor in Houston, where the researchers for that study were based.

We did not include time instructors spent supervising the students as a cost of producing the output. We assumed that all the instructors' time was spent on instruction and education.

d. Number of Student-Hours Spent Producing the Product

Many centers keep written records of the number of students who worked on the project, and the days and hours they worked. When centers did not have written records for the part of the project we valued, we relied on the estimates made by the instructors and the VST coordinator.

2. Relative-Productivity Approach

The relative-productivity approach involves estimating the cost of hiring an alternative worker to do the work of the Job Corps students. This approach was used when the product of the students was harder to define, usually because the students provided a service rather than a product, and only students from one or two trades worked on the project. This approach was used to value 13 WE projects and 2 VST projects.

This approach involved four basic steps: (1) identifying the student(s) to study; (2) identifying the worker who would do the work if the Job Corps student(s) did not do it; (3) estimating the hourly cost of the alternative worker; and (4) adjusting for differences between the Job Corps student and alternative worker in productivity, amount of materials used, and amount of supervision required.

a. Identifying the Students to Study

In all cases, we valued the work performed by the one or two students who had recently ended their work experience or VST project at the time of the site visit.[12] In most cases, the student was still working at the assignment at the end of the three-month reference period. However, we believe

[12]We studied one student in 11 of the projects and two students in 4 of the projects.

that choosing a student whom the supervisor could remember easily was more important than choosing a student whose work fell exactly within the reference months.

b. Identifying the Alternative Worker

We asked the student's supervisor at the agency providing the WE assignment (or the VST instructor or coordinator): "If no Job Corps student were available to do this work, but the work had to be done anyway, who or what type of worker would most likely do the work of each student?" The supervisor usually named a type of worker who would have done the work, such as secretary, professional carpenter, college student, or clerical worker from a temporary agency. For one project, the supervisor named a specific person.

c. Estimating the Hourly Cost of the Alternative Worker

The hourly cost of the alternative worker has two components: the hourly wage and the value of the fringe benefits (such as health insurance, life insurance, paid leave, retirement and savings, and legally-required benefits). We asked the supervisor the hourly wage rate and cost of benefits for the alternative worker. In all cases, the supervisor was able to tell us the hourly wage, but only three knew the value of the worker's fringe benefits. We estimated the dollar value of the benefits using 1996 data on the employer costs of fringe benefits published by the Bureau of Labor (DOL 1996). The value of benefits as a percent of wages varied from 10 percent for a service worker in state and local government who only received legally-required benefits to 48 percent for a full-time blue-collar worker in the private sector who received a full set of benefits.

d. Adjusting for Differences in Productivity, Amount of Materials or Supplies Used, and Amount of Supervision Required

Our goal was to estimate how much it would cost per hour to employ an alternative worker to do the same work as the Job Corps student. If the student and the alternative worker were equally productive, used the same amount of materials and supplies, and required the same amount of supervision, the hourly wage plus cost of fringe benefits would be the value of the output per hour. However, if the student was more or less productive, used different amounts of materials or supplies, or required different amounts of supervision, we adjusted for these differences.

We asked the student's supervisor to estimate how long it would take a student to complete the same amount of work as the alternative worker would complete in an hour. To adjust for differences in productivity, we divided the hourly cost of the alternative worker by the number of hours (or fraction of an hour) it would take the student to do the same work. For example, if the student needed two hours to complete what an alternative worker could do in one hour, the value of the student's services would be half the hourly cost of the alternative worker.

If the student required more (less) materials/supplies or different amounts of supervision, we subtracted (added) the cost of these additional requirements per hour from the hourly cost of the alternative worker to calculate the value of the output of the student.

E. ESTIMATE OF THE VALUE OF OUTPUT INCLUDED IN THE BENEFIT-COST ANALYSIS

This report presents an estimate of the total value of the output produced by students in Job Corps during one year. For each project in our sample, we estimated the value of the total output produced by students in Job Corps during the three reference months. After attaching a weight to each project, we added up the value of the output of all sampled projects. This sum represents an estimate of the value of output produced in Job Corps in one year.

We also report the total value of output produced in Job Corps per *student-year*. This is the total value of output produced during one year divided by the number of student-years. A student-year is equivalent to one student participating in Job Corps for one year. It is calculated from the average monthly number of students who participate in Job Corps.

For consistency with other entries in the benefit-cost analysis, we will include in the benefit part of the benefit-cost analysis a *per student* estimate of the value of output produced during work projects. We will obtain this estimate by multiplying the estimate of the total value of output produced per student-year by an estimate of the average fraction of a year students are enrolled in Job Corps. For consistency with the rest of the benefit-cost analysis, we will use an estimate of the average length of stay of students in the sample selected for the impact analysis. As we have not yet completed our impact analysis, this report does not present a per student estimate of the value of output.

III. FINDINGS OF THE STUDY

This chapter presents our estimates of the value of the output produced by students during work projects. Section A describes characteristics of the sampled work projects. Section B discusses our estimates of the number of student-days spent on work projects in Job Corps in one year. Section C discusses our estimates of the value of the output produced per student-day spent on work projects based on studies of 44 sampled projects. Section D discusses how our estimate of the value of output produced annually by students conducting work projects. Finally, Section E presents a discussion of the sensitivity of our estimates to alternative assumptions.

A. CHARACTERISTICS OF PROJECTS

To put our estimates in context, we begin by describing some of the characteristics of the projects in our samples. Table III.1 presents the percent distributions of the type of projects in three samples. The first sample consists of all projects that were worked on in the 23 selected centers in the reference months. The second sample consists of all projects that were worked on in the 23 centers in the reference months *excluding* those projects that are center-serving. By center-serving, we mean projects that reduce the operating costs of the center while not making any lasting improvements in the center's facilities. This second sample represents the sample frame for the selection of the projects to study. The third sample consists of the 44 projects that were studied in detail. We present the percentage distributions of both the number of projects and the number of student-days spent on projects. We weighted each observation in the first sample so that the distribution of types of projects represents the distribution of all work projects in all Job Corps centers. The weighted distributions of types of projects in the second and third samples represent

TABLE III.1

CHARACTERISTICS OF WORK PROJECTS
(Weighted Percentage Distributions)

Characteristic	All Projects in 23 Selected Centers		Projects Included in the Sample Frame[a]		Projects Selected for Study	
	Number of Projects	Student Training Days	Number of Projects	Student Training Days	Number of Projects	Student Training Days
Type of Work Project						
VST	42.0	79.0	37.8	74.3	34.3	73.0
WE[b]	58.0	21.0	62.2	25.7	65.7	27.0
Location						
On center	42.0	70.1	27.5	59.0	28.9	58.2
Off center	56.0	27.2	70.4	38.9	71.1	41.8
Both[c]	2.0	2.7	2.1	2.1	0	0
Type of Project by Location						
VST on-center	33.2	67.0	27.2	58.9	28.9	58.2
VST off-center	6.8	9.3	8.5	13.3	5.4	14.8
WE on-center	8.8	3.2	0.4	0.1	0	0
WE off-center	49.2	17.9	61.8	25.5	65.7	27.0
Projects that took place both on and off center	2.0	2.7	2.1	2.1	0	0
Project Comprises Multiple Smaller Projects	6.8	13.4	3.1	8.1	10.7	15.4
Number of Observations	**504 projects**	**65,189 days**	**410 projects**	**47,559 days**	**44 projects**	**16,020 days**

SOURCE: Tables completed by center staff prior to our visit to the center.

[a]Excludes center-serving projects.

[b]Includes school-to-work projects.

the distributions of all work projects in all Job Corps centers, excluding those projects that are center-serving.

In the three reference months, students in the 23 centers worked on 504 projects, an average of 22 projects per center. On average, 2,834 student-days were spent on work projects at a center during the three reference months. However, the number of projects and the number of student-days spent on projects varied considerably by center. At one center, 6 projects took place in the three reference months; at another center, 62 projects took place during the reference months. The number of student-days spent on projects varied among centers from 1,286 to 6,391. The variation is even greater when we control for the size of the center--student-days spent on work projects in the reference months varied between 2 and 26 per student at the center.

VST projects account for only 42 percent of all projects but, because they typically involve more students than WE projects, they account for 79 percent of all student-days spent on projects. WE projects account for 58 percent of all projects and 21 percent of student-days spent on projects.[1] While the number of projects that take place off center is larger than the number of projects that take place on center, about 70 percent of student-days spent on work projects are spent on projects that take place on center. Most VST projects (79 percent) take place on the centers' facilities or grounds, while most WE projects take place in the community. Seven percent of all projects are VST projects that encompass multiple small projects that are grouped together under the same project number as a "miscellaneous" project when the VST plans are completed. These projects account for about 13 percent of all student-days spent on projects. About 2 percent of all projects take place both on and off center usually because the project encompasses multiple smaller projects.

[1]This includes 20 school-to-work projects, just over 10 percent of all WE projects.

We excluded about one-fifth of the projects because they were center-serving. These projects were disproportionately large, they accounted for just over one-quarter of all student-days spent on projects. When center-serving projects are excluded from the sample, a somewhat higher proportion of both the number of projects and the number of student-days are spent on WE assignments. As, by definition, all center-serving projects take place on-center, a much higher proportion of non-center-serving projects are located off-center (70 percent compared with 56 percent of all projects). After excluding center-serving projects from the sample, a smaller proportion of projects are comprised of multiple smaller projects.

The projects we sampled to study in detail (excluding the two for which we were unable to complete the study) account for about 11 percent of all non-center-serving projects and about 34 percent of all student days spent on non-center-serving projects. By chance, a higher proportion of projects that comprise multiple small projects were chosen for the study than were represented in the sample frame.

Table III.2 presents the distribution of the trades that were involved in the work projects. Because we do not have data on the number of student-days spent on work projects by trade, the table presents the percent distribution of the *number* of work projects that involved students from each trade, but not the number of student-days by trade. In the whole sample, 25 percent of projects (26 percent in the sample frame and 29 percent of the sampled projects) provide training for students from more than one trade. About 40 percent of all work projects in the whole sample (37 percent of projects in the sample frame and 34 percent of the sampled projects) involved one or more construction trades. The construction trades most frequent involved in work projects are carpentry, building and apartment maintenance (BAM), and painting. After construction, work projects are most likely to involve clerical trades (20 percent of all projects in the whole sample and in the

TABLE III.2

TRADES INVOLVED IN WORK PROJECTS

Trade	Weighted Percentage of Projects that Involve Trade[a]		
	All Projects in 23 Centers	Sample Frame for Selection of Projects[b]	Sample of Projects
Multiple trades	25.4	26.1	29.1
Construction Trades			
Building and Apartment Maintenance (BAM)	17.4	15.8	12.4
Bricklayer	4.3	4.3	5.6
Carpentry	19.3	19.3	26.6
Electricity	1.2	1.5	1.2
Masonry	8.9	10.6	10.8
Painting	14.9	13.1	18.2
Plastering	2.9	3.5	7.7
Plumbing	4.6	4.4	4.7
Floor Laying	0.7	0.9	0
Any construction trade	40.1	36.6	33.5
Other Trades			
Automotive[c]	1.7	2.1	13.9
Electronics assembler	5.3	5.9	4.3
Welding	9.5	10.1	24.8
Landscaping	3.3	3.4	4.1
Lithographic printing	1.4	1.7	3.7
Clerical[d]	20.3	20.0	17.1
Food services	8.4	7.6	3.0
Health occupations[e]	12.4	12.7	4.7
Retail sales	1.5	1.4	0
Security	2.5	2.6	0
Other trades not listed	7.4	8.7	1.0

SOURCE: Tables completed by center staff prior to our visit to the center.

[a]Percentages sum to more than 100 percent because some projects involved students from more than one trade.

[b]Excludes center-serving projects.

[c]Includes automotive, auto body repair, auto parts clerk, and auto repair.

[d]Includes business and clerical occupations and accounting .

[e]Includes dental and medical assistant.

sample frame and 17 percent of all chosen projects) and health occupations (12 percent of projects in the whole sample, 13 percent of projects in the sample frame, and 5 percent of chosen projects). By chance, a slightly higher proportion of projects that involve painting, carpentry, automotive, and welding students and a slightly lower proportion of projects that involve food services, health occupations, and BAM, were selected for in-depth study than were in the sample frame.

B. NUMBER OF STUDENT-DAYS SPENT ON WORK PROJECTS

From the information provided by the centers before our visit, we calculated the number of student-days that were spent on work projects at each of the 23 centers during the three reference months. Table III.3 presents estimates of the number of student-days spent on all Job Corps work projects in 12 months for the whole sample of projects and only non-center-serving projects.[2] The estimates exclude any time spent on traveling to and from the work site, classroom training time, and time spent on hands-on training that did not result in a finished product. To put the estimates in context, we present the number of student-days spent on work projects per student-year by dividing the number of student-days by 34,340, the average number of students at Job Corps centers during the study.[3]

We estimate that in one year, students spent more than one million days (6 hours per day) on VST or WE projects. On average, students spent about 31 days per student-year on all work projects. About 79 percent of these days were spent on VST projects and 21 percent were spent on WE projects.

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[2]Estimated standard errors are presented in Table C.1 in Appendix C.

[3]The figure 34,340 is a weighted average of the average number of students at the 103 centers in the sample frame in program year 95 and program year 96. The weights reflect the proportion of the reference months that fall in program year 95 (77 percent) and program year 96 (23 percent).

TABLE III.3

ESTIMATES OF THE NUMBER OF STUDENT-DAYS SPENT ON WORK PROJECTS IN ONE YEAR
(Weighted)

	All Work Projects		Work Projects That Are Not Center-Serving	
Type of Project	Total Number of Student-Days	Number of Days Per Student-Year	Total Number of Student-Days	Number of Days Per Student-Year
WE	221,343	6	189,054	6
VST	830,757	24	547,280	16
All	1,052,100	31	736,334	21

Nearly three-quarters of a million days (about 70 percent of the total) were spent on non-center-serving projects--projects that result in a lasting improvement in the center facilities or grounds or serve the community. The remaining 30 percent of student-days were spent on center-serving projects--projects that reduced the operating costs of the center without resulting in lasting improvements to the center. On average, 21 days per student-year were spent on non-center-serving projects and 10 days per student-year were spent on center-serving projects.

Job Corps regulations (DOL 1993, PRH-4, page 11) state that students in the construction or repair trades or other trades that result in a finished product should spend at least 65 percent of their time in vocational training on VST projects. Some "back of the envelope" calculations suggest that the centers meet this requirement. We estimate that this requirement would be met if about 72 days per student-year were spent on VST projects by students in these trades. This assumes that (1) students are enrolled in vocational trades about 220 days per year,[4] (2) once enrolled in a vocational program, students spend half their time in vocational training, and (3) students spend 65 percent of their time in vocational training on VST projects. Our study found that 830,757 student-days were spent on VST projects in Job Corps per year. Assuming that about 30 percent of all students were enrolled in a trade that involved VST projects (10,302 students) during the study, we estimate that 81 days (830,757/10,302) per year were spent on VST projects per student enrolled in a trade that uses VST projects for training.[5]

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[4]This assumes that students do not work on 20 work days of the year because of federal holidays and other days in which the center closes because of holidays. It also assumes that students on average do not begin vocational training until they have been on center for 20 work days. During this time students may participate in programs such as the Occupational Exploration Program and English as a Second Language. Thus, out of 260 potential work days per year, we estimate that students are enrolled 220 days in vocational or academic training.

[5]In 1996, about 30 percent of all terminees trained in a construction trade.

It is also useful to compare our estimate of the number of student-days spent on work projects per student-year with the estimates from a previous evaluation of Job Corps (Long 1979) conducted in 1977-78. In this previous study, it was estimated that students spend 69 days on work projects per student-year, a much higher figure than our estimate of 31 days. We believe that differences in methodology rather than real changes account for the difference between the two studies in the estimates of the number of work days spent on work projects. In the previous study, the number of student-days was estimated by asking staff at the sampled centers in April or May how many students at the centers were working on work projects and dividing this by the number of students at the centers. The researchers found that 26.6 percent of students were working on work projects at the time they called. The number of student-days was estimated by applying this percentage to the number of work days in the year (26.5 percent of 260 days). We identified the following differences in approach that appear to fully account for the difference between our estimate and the estimate made in the previous study:

- ***The previous study considered a day when a student worked on the project for any length of time to be a "student-day."*** In this study, we asked for the number of *hours* spent on the projects and then converted the hours to days by dividing by 6. If we replicate the previous methodology with our data--counting a day as one day if a student had worked on the project at all--our estimate of the total number of student-days spent on the project increased by 7.9 percent. Hence, if the previous study had used our methodology, and the differences in the estimates were the same as they are in our data, their estimate would have been 64 days per student-year.

- ***The previous study assumed that students work every weekday during the year.*** Job Corps centers, however, observe federal holidays and are closed between Christmas and New Year. A more realistic assumption is that they work 240 days a year. Further adjusting for this difference, the previous estimate would have been 59 days per student per year.

- ***The previous study assumed that students work on projects at the same rate throughout the year as they do in April and May.*** However, because the weather is good, spring is typically a heavy season for VST projects. We found that the number

of student-days spent on work projects in the six centers with reference months of April, May, and June was 2.1 times greater than the average for all centers. This suggests large seasonal differences in the amount of time spent on work projects. If the estimate in the previous study was twice as large because it was based on data from the spring, and we make the appropriate adjustments, their estimate of the amount of time spent on work projects would be 30 days per student-year.

C. VALUE OF OUTPUT PRODUCED PER STUDENT-DAY ON WORK PROJECTS

We based our estimates of the value of output produced per day on in-depth studies of 44 projects. None of the 44 projects are center-serving. Table III.4 lists the 44 projects with the estimate of the value of output produced per student-day on each project. Appendix B describes each project and summarizes the derivation of our estimate of the value of output for the project.

When interpreting our estimates of the value of output it is important to keep in mind that training the students is the primary objective of the Job Corps work projects and producing output is a secondary objective. Our estimates explicitly do not capture the training element of the projects. A project whose output per student-day is low may still provide a rich training environment for the students.

Estimates of the value of output produced per day vary greatly across projects, as they did in the previous Job Corps study, ranging from 12 cents to $113.31. The differences reflect the large variation in the types of projects that are conducted and the skill level of the students that are assigned to different work projects.

Estimates of the (weighted) average value of output produced by students working on non-center-serving projects are presented in Table III.5. (Standard errors of these estimates are presented in Table C.2 in Appendix C.) On all non-center-serving projects, the average value of output is $39.00 per student-day and $6.50 per student-hour. The average value of output produced per student-hour is $5.49 for the 31 VST projects and $7.01 for the 13 WE projects. The higher value

TABLE III.4

ESTIMATES OF THE VALUE OF OUTPUT PER STUDENT-DAY

Project Number	Description	VST or WE Project	On or Off Center	Value Per Student Day
1.	Providing nursing duties at a local air force base	WE	Off	$41.40
2.	Constructing a storage building on the center	VST	On	$37.62
3.	Painting a forest service warehouse	VST	Off	$31.80
4.	Building a mock-up wall in the center's paint shop	VST	On	$70.61
5.	Working at a printing shop at a local college	WE	Off	$31.38
6.	Working in the food service department at a local college	WE	Off	$31.38
7.	Welding at a privately-owned manufacturing company	WE	Off	$61.38
8.	Renovating a porch on a center building	VST	On	$27.17
9.	Constructing a baseball dugout at a local high school	VST	Off	$23.17
10.	Constructing a new dormitory on the center	VST	On	$49.00
11.	Constructing a storage building on the center	VST	On	$19.26
12.	Constructing picnic tables for use on the center	VST	On	$43.76
13.	Maintenance work at an apartment complex	WE	Off	$69.73
14.	Renovating a bathroom in a senior community center	VST	Off	$15.36
15.	Constructing a BAM shop and warehouse on the center	VST	On	$15.28
16.	Installing a sprinkler system on the center	VST	On	$18.03
17.	Building identification signs on the center	VST	On	$4.95
18.	Working at a private auto paint and body shop	WE	Off	$49.84
19.	Building and staining a bookcase	VST	On	$21.22
20.	Renovating the painting shop on the center	VST	On	$24.91
21.	Remodeling an instructional building on the center	VST	On	$7.18
22.	Refurbishing the electrical shop on the center	VST	On	$8.55
23.	Providing nursing assistance at a local convalescent home	WE	Off	$39.18
24.	Adding to the nonresidential building on the center	VST	On	$21.46

TABLE III.4 *(continued)*

Project Number	Description	VST or WE Project	On or Off Center	Value Per Student Day
25.	Adding to the center's administrative building	VST	On	$35.38
26.	Performing clerical work at a local community college	WE	Off	$38.02
27.	Building a concrete pad and shelter on the center	VST	On	$23.36
28.	Building a shade house on the center	VST	On	$19.18
29.	Making cigarette butt containers for use on the center	VST	On	$4.87
30.	Building a brick wall on the center	VST	On	$8.49
31.	Rehabilitating the math area on the center	VST	On	$19.09
32.	Rehabilitating the bricklayers' classroom on the center	VST	On	$64.31
33.	Replacing a door to the transportation shop on the center	VST	On	$4.12
34.	Replacing storm windows on a center building	VST	On	$2.77
35.	Building furniture for a patio on the center	VST	On	$0.12
36.	Landscaping at a local apartment complex	WE	Off	$48.93
37.	Building an entrance to a dormitory on the center	VST	On	$113.31
38.	Performing clerical work at a local employment service office	WE	Off	$30.76
39.	Welding at a private manufacturing company	WE	Off	$36.00
40.	Building student lockers on the center	VST	On	$46.95
41.	Conducting two "miscellaneous" community projects	VST	Off	$59.70
42.	Welding at a private manufacturing company	WE	Off	$51.00
43.	Constructing the carpentry shop roof on the center	VST	On	$88.31
44.	Providing patient care at a local Veteran Affairs hospital	WE	Off	$81.36

TABLE III.5

ESTIMATES OF THE AVERAGE VALUE OF OUTPUT PRODUCED PER STUDENT-DAY SPENT ON NON-CENTER-SERVING PROJECTS
(Weighted)

Type of Project	Average Value Per Student-Day	Average Value Per Student-Hour
WE	$42.06	$7.01
VST	$32.94	$5.49
All	$39.00	$6.50

per student-hour spent on WE projects compared with VST projects is consistent with our expectations that students working on WE projects (who are near the end of their training) will have achieved higher skill levels than students working on VST projects (who may have just begun their training).

Because the value of output in each WE project was estimated by the relative-productivity approach, we know the hourly wage of the alternative worker for students conducting WE projects. In the studied WE projects, the alternative worker would be paid between $4.75--the federal minimum wage at the time of the study--and $8.67 per hour. On average, they were paid $6.47 per hour. In seven WE projects, the students' supervisors rated the students as equally productive as the alternative worker, said the student used the same amount of materials and supplies, and said that they required the same amount of supervision. The student was rated as less productive, used more materials or supplies, or required less supervision in only two WE projects. In the remaining four WE projects, students were either *more* productive, used *less* materials or supplies, or required *less* supervision than the alternative worker. The average wage of students in WE assignments is about 8 percent higher than the $5.98 average hourly wage for Job Corps students who were placed in program year 1995 (DOL 1997).

Our estimates of the value of output per student-day are within the same range as those from previous studies. Table III.6 presents estimates of the output value produced in Job Corps and other employment programs from previous studies. Accurate comparisons across studies are difficult because of differences in methodology between studies. Different studies estimate the value of output over different observation periods (such as a hour, a day, or week) sometimes without reporting how long a student works on the project during this time period. Also, different studies remove different costs from their estimates. The previous Job Corps study, for example, did not

TABLE III.6

COMPARISON OF ESTIMATES OF VALUE OF OUTPUT
FROM PREVIOUS STUDIES

Program	Study	Value of Output (1996 Dollars)
Job Corps	Long (1979, pp. 28-29)	$35.50 per day[a]
Employment Opportunity Pilot Project	Long, Thornton, and Whitebread (1983, p. 145)	$223.35 per week
Youth Employment Projects funded under the Comprehensive Employment and Training Act	Zimmerman and Masters (1978, p. iii)	$6.68 per hour
Supported Work	Kemper and Long (1981, p. 164)	$1.59 per hour[b]

[a]Only for WE projects

[b]All supervision costs are subtracted from the estimate.

subtract from the value of output the material costs incurred by Job Corps during VST projects but included those costs in the cost part of the benefit-cost analysis. In our study, we subtracted the costs of materials and supplies from the supply price, but we will not include the costs of materials and supplies used in VST projects (and paid out of VST funds) as a cost in the benefit-cost analysis.[6] This methodological difference affects the estimate of the output value but will not affect the difference between the value of benefits and costs. There are no VST materials and supplies used for the WE projects, so we can compare the value of output produced by WE projects across the two studies. The estimate made in the previous Job Corps study of the value of output produced per day during WE projects ($35.50 per day) is about 16 percent lower than our estimate. The estimates from the Supported Work Evaluation are much lower than our estimates because all costs of supervision were subtracted from the supply price in that study.

D. ESTIMATES OF THE VALUE OF OUTPUT PRODUCED ANNUALLY DURING WORK PROJECTS

Table III.7 presents estimates, by type of project, of the total value of output produced by Job Corps students in one year and the total value of output produced per student-year. (Standard errors of these estimates are presented in Table C.3 in Appendix C.) These estimates were derived by summing over the value of the output created by the students working on each studied project during the reference months. Each project was weighted so that the sum represents the total value created in all Job Corps in one year during work projects that were not center-serving.[7]

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[6]We chose this methodology so that we would be able to compare the value of output between WE and VST projects.

[7]This is not mathematically equal to the product of the number of student-days spent on work projects and the average value of output produced per student-day.

TABLE III.7

ESTIMATES OF THE VALUE OF OUTPUT PRODUCED ANNUALLY BY JOB CORPS STUDENTS WHILE WORKING ON NON-CENTER-SERVING PROJECTS
(Weighted)

Type of Project	Total Value of Output	Value Per Student-Year
WE	$9.2 million	$266.85
VST	$17.9 million	$521.95
All	$27.1 million	$788.79

We estimate that students produce output and services worth more than $27 million per year while participating in non-center-serving work projects. This is equal to about $789 per student-year. Sixty-six percent of this value is produced during VST projects and 34 percent is produced during WE projects.

An estimate of the value of output per *student* will be included in the benefit-cost analysis. This estimate will be derived by multiplying the estimate of the value of output per student-year ($789) by an estimate of the average length of stay of students in the sample derived for the impact analysis. We have not yet obtained an estimate of the length of stay of students in our sample. However, in PY95, the average length of stay was 6.9 months (DOL 1997). If the average length of stay of students in our impact analysis is equal to this average, the benefit from the output produced during non-center-serving work projects included in the benefit-cost analysis will be $454 (6.9 ÷12 x $789).

As we discussed in Chapter II, the value of center-serving projects will be implicitly included in the cost part of the benefit-cost analysis in lower than otherwise center-operating costs. Hence, including the value of the center-serving projects in the benefit part of the benefit-cost analysis would double count the benefit. For this reason, we did not study in detail any center-serving project. But because 30 percent of student-days are spent on center-serving projects, we present some estimates of the value of these projects--the reduction in center-operating costs--in Table III.8. As we did not estimate the value of the output produced per day students worked on center-serving projects, we based our estimates on three different assumptions. Depending on the assumption, the estimates of the reduction in center-operating costs that result from students working on the center vary from $288 to $359 per student-year. First, we assume that, on average, an hour spent by a student on a center-serving project yields output of the same value as an hour spent on a non-center-

TABLE III.8

ESTIMATES OF THE REDUCTION IN ANNUAL CENTER-OPERATING COSTS RESULTING FROM JOB CORPS STUDENTS PARTICIPATING IN CENTER-SERVING WORK PROJECTS

Assumption About the Value of Output Produced Per Student-Hour	Estimate of the Value of Output Per Student-Hour	Number of Student-Days Spent on Center-Serving Work Projects	Total Value of Output	Value Per Student-Year
1. Equal to the average value produced during non-center-serving projects	$6.50	315,766	$12.3 million	$359
2. Equal to the average value produced during non-center-serving projects, by type of project	$5.48 (VST) $7.01 (WE)	283,477 (VST) 32,289 (WE)	$10.7 million	$311
3. Equal to the minimum wage plus legally-required benefits	$5.23	315,766	$9.9 million	$288

serving project ($6.50 per student-hour). Under this assumption, we estimate that the value of output of center-serving projects would be $12.3 million per year (315,766 student-days per year x $6.50 x 6 hours per day) or $359 per student-year ($12.3 million ÷ 34,340). Second, we assume that, on average, an hour spent by a student on a VST center-serving project yields output of the same value as an hour spent on a VST non-center-serving project and an hour spent by a student on a WE center-serving project yields output of the same value as an hour spent on a WE non-center-serving project. Under this assumption, because a higher proportion of center-serving projects are the relatively lower-value VST projects, we estimate a lower value of output per student-year of $311. Third, a low estimate of $288 per student-year is obtained if we assume that the value of output per student-hour produced during center-serving projects is equal to the minimum wage ($4.75 at that time) plus the value of legally-required benefits for service workers in state and local governments (about 10 percent of the wage).

While the output produced during both center-serving and non-center-serving projects is significant, it is only a small fraction of the operating costs of Job Corps. The operating costs of Job Corps (in all centers) was nearly $26,000 per student in program year 1995. The output produced during non-center-serving work projects offsets only about 3 percent of these costs. Students working on center-serving projects offset only another 1 to 1.5 percent of the total operating costs of the center.

E. SENSITIVITY OF ESTIMATES TO ALTERNATIVE ASSUMPTIONS

While we believe that our estimates are reasonable, we made several important assumptions when making these estimates. To assess their appropriateness, we discussed the assumptions with center staff and other staff involved in the work projects. This section discusses what we learned

about the appropriateness of each assumption. It also discusses the sensitivity of our estimates to these assumptions.

1. Someone Would Be Willing to Buy the Students' Output at the Supply Price

Using the supply-price as a measure of the value of output assumes that someone is willing to pay that price for the output of the students. If no one is willing to pay the supply price, the supply price is an overestimate of the true value. For example, the supply price of a training project that involved students digging a hole and then filling it in would be the cost of paying a laborer to dig the hole and fill it in. But the true value of the output would be zero.

To assess whether someone would be willing to pay the supply price for the output of the students, we asked the VST coordinator or the representative of the off-center site the following questions:

- If Job Corps students had not done this work as a WE/VST project, do you think the work would have been done anyway by someone else?
- Would it have been done at the same time or would it have been postponed?
- Would the work have been done differently?

Not surprisingly, respondents had difficulty with these hypothetical questions. The questions require the respondents to think about a hypothetical situation--what *would* have happened if the work projects had not been performed by the students. Many respondents felt they did not have the knowledge to provide informed answers. This should be borne in mind when interpreting the responses to these questions.

Table III.9 summarizes the responses to these questions, by whether the project was conducted on- or off-center. According to the respondents, more than one-third of the projects (16 out of 44)

TABLE III.9

PERCEPTIONS OF WHETHER, WHEN, AND HOW WORK PROJECTS WOULD HAVE BEEN DONE IN THE ABSENCE OF JOB CORPS WORK PROJECTS

	Location of Project		
	On Center	Off Center	All
All work would have been done	11	15	26
Same time/same way	4	12	16
Same time/different way	1	1	2
Postponed/same way	5	2	7
Postponed/different way	1	0	1
Some of the work would have been done	2	1	3
Same time/same way	0	1	1
Same time/different way	0	0	0
Postponed/same way	1	0	1
Postponed/different way	1	0	1
None of the work would have been done	14	1	15
Total	**27**	**17**	**44**

would have been done at the same time and in the same way, even if students had not been available to do the work.

About one-third of the projects (15 out of 44) would *not* have been done at all had students not been available to do the work. For example, one project involved the students building a shade house for storing planting materials. Center staff believed that, although this was a useful addition to the center, they would not have obtained funding for the project if students had not been able to do the work.

The remaining third of the projects would have been delayed, done in a different way, or only partly completed without the students. A frequent response to questions about whether a project would have been done if students had not done the work was that it would have been done *eventually*. This suggests that at the time the work project was done, no-one was willing to pay the supply price. Some projects would have been done differently. For example, a bricklaying project would have had a simpler design if it had not been designed for training. In other projects, only part of the project would have been done. For example, in one VST project, the Forest Service would have bought 100 plant pallets rather than having students build 150.

These responses suggest that for all but 16 of the projects, people would not be willing to pay the supply price for the output. However, we have no information about how much they would be willing to pay.[8] Each of the projects we studied did, however, produce an output or service of some value.

The likelihood that projects would have been conducted in the absence of VST projects varied by whether the "recipient" of the output or service was Job Corps or an outside agency. Of the 17 off-center projects (13 WE and 4 VST projects), 12 would have been done at the same time in the

[8]In the interviews, we asked respondents how much they would be willing to pay, but most respondents could not respond.

same way in the absence of Job Corps students, and only one would not have been done at all. In contrast, of the 27 on-center projects (all VST), only 4 would have been done at the same time in the same way without Job Corps students and 14 would not have been done at all.

How would our estimate of the value of output differ if for some projects someone would *not* be willing to pay the full supply price? Table III.10 presents estimates of the value of output per student-year under five different assumptions:

1. Someone is willing to pay the supply price for the output. This is our benchmark assumption.

2. Someone is willing to pay the supply price for the output of off-center projects but no one is willing to pay anything for the output of on-center projects.

3. Someone is willing to pay the supply price for the output of off-center projects and someone is willing to pay half the supply price for the output of on-center projects.

4. Someone is willing to pay the supply price for the output of projects that would have been done in the same way and at the same time in the absence of Job Corps students but no one is willing to pay anything for the output of other projects.

5. Someone is willing to pay the supply price for the output of projects that would have been done in the same way and at the same time in the absence of Job Corps students and someone is willing to pay half the supply price for the output of other projects.

Under each of the alternative assumptions, the value of output is lower than under the benchmark assumption. The second and fourth assumptions, while unrealistic, provide a lower-bound estimate of the value of the output. The value of the output is lowest under the fourth assumption--less than one-hal'f the value of the output under the benchmark assumption. Assumptions three and five are perhaps more realistic. Under these assumptions, the value of output is between 72 and 74 percent of the value estimated under the benchmark assumption.

TABLE III.10

ESTIMATES OF THE VALUE OF OUTPUT UNDER DIFFERING ASSUMPTIONS ABOUT THE WILLINGNESS TO PAY FOR THE OUTPUT
(Weighted)

Assumption	Value Per Year Per Enrollee
Baseline: Willingness to pay is equal to the supply price for all projects (44 projects)	$788.79
Willingness to pay is equal to the supply price for all off-center projects (17 projects) and 0 for on-center projects (27 projects)	$381.69
Willingness to pay is equal to the supply price for all off-center projects (17 projects) and half the supply price for on-center projects (27 projects)	$585.24
Willingness to pay is equal to the supply price for all projects that would have been done in the same way at the same time (16 projects) and 0 for other projects (28 projects)	$340.79
Willingness to pay is equal to the supply price for all projects that would have been done in the same way at the same time (16 projects) and half the supply price for other projects (28 projects)	$564.79

2. Job Corps Students Do Not Displace Other Workers

We assume that the additional work done by Job Corps students on work projects is not offset by a reduction in work done by other professional workers. This assumption would be incorrect if students do work on VST and WE projects that would have been done by professional workers who are unemployed or underemployed. If during work projects students displace professional workers, our estimates will overstate the value of the work projects.

Displacement is most obvious if an organization fires or lays off a worker and replaces them with a Job Corps student who works for free. Job Corps regulations explicitly prohibit this form of displacement. On VST projects, the regulations state "VST projects must not displace currently employed or contractually-required workers or impair existing contracts for services" (DOL1993, PRH-4 p. 11). On WE projects, the regulations state that "work experience students shall not be utilized to replace regular employees, either on or off center" (DOL 1993, PRH-4, p. 27). Based on discussions with staff involved with the 44 sample projects, we found no evidence that Job Corps students displaced workers in this way. No respondent said that workers had been fired or laid off because of the work projects or that the students replaced workers who had quit their job.[9]

A less obvious form of displacement may occur if an organization (such as the center or a community agency) did not hire workers who are unemployed or underemployed because Job Corps students were available to do the work. Without a detailed study of the labor markets affected by the work projects, which would be beyond the scope of our study, we cannot determine whether Job Corps students displace other workers in this way. However, students clearly could not have displaced other workers in projects that would not have taken place in the absence of work projects (reportedly 15 projects). And even in projects which may have been done by professional workers

[9]The Job Corps regulations regarding displacement may have affected the answers we received to questions about displacement.

in the absence of work projects, displacement would only have occurred if the professional workers were underemployed or unemployed. When using the relative-productivity approach, we asked respondents how easy it was for the "alternative workers" to find work. All replied that it was as easy or easier than average for the community. And Job Corps trains students only in vocational trades for which there is thought to be a demand for the skills and hence a tight labor market for the alternative worker.

3. All Costs and Benefits Are Reflected in the Supply Price

Sometimes persons other than the producer or purchaser of a product or service incur costs or benefits from the product or service that are not reflected in the price. Economists refer to these costs or benefits as externalities. An example of an externality would be if the students made improvements to the outside of a building that were enjoyed by members of the community as well as the owner of the building. If there are externalities, depending on the nature of the externality, the supply price will be either greater than or less than the true value of the output. However, we found no evidence of significant externalities for any of the projects we studied.

4. The Students' Output Is of Similar Quality to That of Professional Workers

The supply price will only be a good measure of the value of the students' output if the quality of the students' output is similar to that of professional workers. The supply price will overstate the true value of the students' output if it is of lower quality than that produced by a professional. Conversely, the supply price will understate the true value of the output if students produced output of higher quality than a professional.

We asked the VST coordinator (for on-center projects) and a representative of the outside agency (for off-center projects) to assess the quality of the students' work relative to that of a

professional.[10] Table III.11 summarizes their responses.[11] The students' work was of professional quality in the majority of projects. For just less than one-quarter of the projects (4 WE and 6 VST projects), the students were said to have produced output or services that were superior in quality to the alternative worker or a professional contractor. The students work was inferior in quality to the alternative worker or a professional contractor for only four projects.

When asked about the quality of the students work, many center staff said that Job Corps required students' work to be of professional quality. Students are not sent on WE assignments until they have the skills to produce output of the same quality as a professional worker. During VST projects, students will repeat their work until it is of professional quality, taking longer than their professional counterparts but producing output of the same quality.[12]

5. Summary

Our studies of 44 projects suggest that our estimates of the value of output are unlikely to be significantly biased upward because of displacement, benefits or costs not reflected in the supply price, or differences between the quality of the output produced by the students and professional workers. However, our assumption that someone would pay the supply price for the output is unlikely to be correct for all work projects. Hence, our estimates of the value of output produced during work projects of $789 per student-year should be viewed as an upper-bound estimate.

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[10]For several on-center VST projects, we also asked the instructors and outside contractors to assess the work of the students. The assessments differed in only one case.

[11]When more than one assessment of quality was available, we counted the lowest assessment.

[12]It was found that students took three times as long as professional workers in the two VST projects that were studied by the relative-productivity approach.

TABLE III.11

ASSESSMENT OF THE QUALITY OF STUDENTS' OUTPUT
COMPARED WITH THAT OF PROFESSIONAL WORKERS

Assessed Quality Compared With Professional Worker	Number of Projects
Same quality	30
Higher quality	10
Lower quality	4
Total	**44**

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REFERENCES

Burghardt, John, Todd Ensor, Mark Gritz, Russell Jackson, Terry Johnson, Sheena McConnell, Charles Metcalf, and Peter Schochet. "Evaluation of the Impact of the Job Corps Program on Participants' Postprogram Labor Market and Related Behavior: Study Design Report." Princeton, NJ: Mathematica Policy Research, Inc., July 1994.

Kemper, Peter, and David Long. "Technical Report of Value of In-Program Output and Costs." Princeton, NJ: Mathematica Policy Research, Inc., September 1981.

Kish, Leslie. *Survey Sampling*. New York, NY: John Wiley & Sons, 1965.

Long, David. "Evaluation of the Economic Impact of the Job Corps Program Value of Output in Work Activities." Princeton, NJ: Mathematica Policy Research, Inc., January 1979.

Long, David, Craig Thornton, and Christine Whitebread. "An Examination of the Benefits and Costs of the Employment Opportunity Pilot Project." Princeton, NJ: Mathematica Policy Research, Inc., February, 1983.

McConnell, Sheena. "Guide for Conducting Value-Of-Output Studies of Job Corps Work Projects." Washington, DC: Mathematica Policy Research, Inc, January 1996.

U.S. Department of Labor. "Employee Costs for Employee Compensation–March 1996." Washington, DC: U.S. Department of Labor, October, 1996.

U.S. Department of Labor. *Job Corps: Policy and Requirements Handbook. Notebook 1.* Washington, DC. U.S. Department of Labor, December 1993.

Zimmerman, David, and Stanley Masters. "A Pilot Study of the Value of Output of Youth Employment Programs." Madison, WI: Mathematica Policy Research, Inc., December 1978.

APPENDIX A

WEIGHTS USED IN THE STUDY

We used two sets of weights in this study: (1) center weights for estimates of the total number of student-days spent on work projects and (2) project weights for estimates of the average value produced per student-day worked on projects and the total value of output. This appendix describes the derivation of these weights.

A. CENTER WEIGHTS

Each center was given a weight equal to the inverse of the probability of selecting the center. The centers were chosen using stratified sampling, with the probability of selection proportional to the number of slots at the center. Hence, the probability of selecting center j in stratum h (where h=1, 2, or 3) was:

$$\frac{n_h s_{jh}}{s_{h+}}$$

where n_h is the number of sampled centers in stratum h, s_{jh} is the number of slots in center j in stratum h, and s_{h+} is the total number of slots in stratum h.

The probability of selecting a center in a given 3-month reference period was:

$$\frac{n_h s_{jh}}{4 s_{h+}}$$

Hence, the center weight for center j in stratum h, W_{jh}, is equal to the inverse of this probability:

$$W_{jh} = \frac{4 s_{h+}}{n_h s_{jh}}$$

B. PROJECT WEIGHTS

Two projects were randomly selected from a list of projects that took place in the 3-month reference period at each sampled center. The probability of selection was equal to the number of student-days spent on the work project in the three reference months as a proportion of *all* student-days spent on work projects at the center in the three reference months. Hence, the probability of selecting a project i at center j in stratum h was:

$$\frac{2d_{ijh}}{d_{jh+}}$$

where d_{ijh} is the number of student-days spent on project i at center j in stratum h during the reference months and d_{jh+} is the total number of student-days spent on work projects at the center during the reference months.

The probability of selecting a project i at center j in stratum h in a given 3-month reference period is the product of the probability of selecting project i at center j times the probability of selecting center j:

$$\frac{2d_{ijh}}{d_{jh+}} \cdot \frac{n_h s_{jh}}{4s_{h+}}$$

The project weight, W_{ijh}, is equal to the inverse of this probability:

$$W_{ijh} = \frac{d_{jh+}}{2d_{ijh}} \cdot \frac{4s_{h+}}{n_h s_{jh}}$$

or

$$W_{ijh} = \frac{d_{jh+}}{2d_{ijh}} \cdot W_{jh}$$

Because we did not complete the studies of two projects (at one center), we adjusted the weights for nonresponse. The weights for projects for which we completed the study were multiplied by an adjustment factor, ADJ_h, where:

$$ADJ_h = \frac{\sum_{ij} W_{ijh}}{\sum_{ij \in R} W_{ijh}}$$

where R is the set of projects for which a study was completed. The two projects for which we did not complete the in-depth study were given weights of 0.

APPENDIX B

SUMMARIES OF WORK PROJECT STUDIES

1. PROVIDING NURSING DUTIES AT A LOCAL AIR FORCE BASE

Description

A local air force base has provided work experience assignments to students from the Job Corps center for about four years. They provide assignments to students in two trades: nursing and business/clerical. The student selected for the study was a nursing student. She prepared the examination room and took the weight, height, and vital signs of new patients. The students worked at this assignment about three days a week for six weeks.

Estimate of the Value of Output

We used the relative-productivity approach to value the work of a nursing student who had recently worked at the air force base. Her supervisor said that if she had not done the work, a medical technician would have done the work. A medical technician earns $5.00 an hour and receives all military benefits. Because no estimates are available of the value of military benefits, to value the benefits we used BLS estimates of the value of benefits as a percentage of wages and salaries for full-time service workers in the private sector (37.9 percent). Including these benefits, we estimate the alternative worker's total compensation to be $6.90 an hour. The supervisor thought that the student was about as productive as the medical technician, used the same amount of materials, and required the same amount of supervision. Hence, we estimated the value of output produced by the student at $6.90 an hour or $41.40 per day.

According to the student's supervisor, the work needed to be done and, if it had not been done by a Job Corps student, would have been done by the medical technician already employed by the air force.

2. CONSTRUCTING A STORAGE BUILDING ON THE CENTER

Description

The center needed additional space to store supplies for VST projects. The students built a 100 foot by 36 foot wood-frame storage building on center as a VST project. The building has a metal roof, openings for three overhead doors, and three walk doors. The interior has two framed partitions and three framed and dry-walled rooms. Students from the BAM, carpentry, plumbing, and electrician trades began work in July 1994. The students dug footing, set the footing forms, laid the concrete foundation, set the stemwall forms, set anchor bolts, set the floor drains and lines, ran the sewer lines out of the building to a man hole, backfilled the stemwalls with sand, framed walls, framed partitions, set the trust joist, sheeted the top of the trust joist, installed the roofing, and formed concrete ramps. The center hired a contractor to help with some of the concrete work. The following tasks had not been completed at the time of the site visit in January 1997: the siding, doors, most of the drywall, painting, plumbing fixtures, permanent lighting, heating and cooling, and electrical power and receptacles.

Estimate of the Value of Output

We valued the output of the project using the independent-estimate approach. We asked a local construction company to provide a bid for the work that had been completed at the time of the site visit. Their bid was $97,986. The Job Corps students in the four trades spent a total of 10,560 student hours on the project. The cost of materials, supplies, and services for the project, including the cost of the contractor who finished some of the concrete work, was $31,774. (This was about $4,300 less than the cost of materials bid by the outside contractor). Hence, we estimated the value of output at $6.27 an hour (($97,986 - $31,774)/10,560) or $37.62 a day.

The VST coordinator did not think any of the work would have been done if it had not been a VST project.

3. PAINTING A FOREST SERVICE WAREHOUSE

Description

The U.S. Forest Service required a warehouse to house their equipment. The Forest Service designed the warehouse and requested that Job Corps students provide most of the labor to build it. Job Corps students constructed the building with some help from subcontractors. In the reference months, Job Corps students did the painting and electrical work. The student painters taped dry wall and wainscoted the interior. They also painted exterior siding, overhead doors, walk doors, windows, fascia, and soffit. This work had taken the painting students about one month.

Estimate of the Value of Output

We valued only the work done by the painting students on the exterior of the building. This was most of the work that took place during the reference months. Using the independent-estimate approach, we asked an independent contractor to provide a bid for the painting work. The bid was $3,682. Five students worked seven hours a day for 16 days on the project, for a total of 560 student hours. The U.S. Forest Service provided all the materials. Unfortunately, we were unable to obtain the amount the Forest Service spent on materials. Hence, we used the estimate provided by the contractor of $714. This included the cost of paint, stain, brushes, rollers, cloths, and rags. Using this estimate, we valued the output at $5.30 (($3,682 - $714)/560) per student-hour or $31.80 per student-day.

The VST coordinator believed that none of the work would have been done in the absence of VST projects.

4. BUILDING A MOCK-UP WALL IN THE PAINT SHOP

Description

As a VST project, students upgraded the paint shop to create more space and a better arrangement for training. Tasks performed by the students in the completed project included wiring the lights, demolishing cement walls, reconstructing new cement block walls, setting up door and window frames, tiling floors, dry-walling, building of stairs and loft flooring, and painting. During the reference months, two students set up a mock-up wall for training in drywall finishing. The project required students to frame walls, build a soffit, hang plasterboard, and set the corner beams. This work took place in April 1996.

Estimate of the Value of Output

We valued the building of the mock-up wall using the independent-estimate approach. We asked a local construction company to estimate what they would bid for the building of the mock-up wall. Their bid was $451. The two students spent seven hours per day for two days working on the project, for a total of 28 student hours. The material costs for the mock-up wall were $121.50, all paid out of VST funds. Hence, we estimated the value of output for this part of the project to be $11.77 an hour (($451.00 - $121.50)/28) or $70.61 per day.

According to the VST coordinator, the work would not have been done if it had not been paid for from VST funds.

5. WORKING AT A PRINT SHOP AT A LOCAL COLLEGE

Description

Printing students from the Job Corps center work at a nearby college printing shop as a work experience assignment. The students do press work, binding work, and camera work, as well as drilling holes, folding, stripping, and making plates. Students have been going to this work experience site for more than 10 years.

Estimate of the Value of Output

We valued the output of a student using the relative-productivity approach. The printing shop manager said that before his budget was cut, he had used college students to do similar tasks. The college paid the college students $4.75 per hour, which at that time was the minimum wage. They received only legally-required benefits. Based on BLS estimates of the value of benefits as a percentage of wages and salaries of service workers in state and local government (10.0 percent), we estimated the benefits to be 48 cents per hour, for a total compensation of $5.23 per hour. The printing shop manager said that the Job Corps students were about as productive as the college students, used the same amount of materials and supplies, and required the same amount of supervision. We estimated the value of output of the student at $5.23 per hour or $31.38 per day.

The printing manager said the work had to be done. Budget cuts meant that he could not hire a college student to do the work. In the absence of Job Corps students, he would have had to do the work himself.

6. WORKING IN THE FOOD SERVICE DEPARTMENT AT A LOCAL COLLEGE

Description

As a work experience assignment, Job Corps students from the food service trade worked at the food service department of a local college, being short-order cooks, making pizzas, baking cakes and cookies, frying chicken, making salads, making sandwiches, and busing tables. Students have been going to this site for four years.

Estimate of the Value of Output

We estimated the value of output using the relative-productivity approach. We chose the student who was currently on the assignment at the time of the site visit for the study. This student was two days from the completion of her assignment at the time of the interview with her supervisor. College students worked beside the Job Corps student doing the same sort of tasks. Hence, we used a college student as the alternative worker. The college student was paid $4.75 an hour, which at that time was the minimum wage, and received only legally-required benefits. Based on BLS estimates of the value of the legally-required benefits as a percentage of wages and salaries for service workers in state and local government (10.0 percent), we estimated the value of those benefits to be 48 cents. Hence, we estimated the hourly compensation of college students to be $5.23. As the Job Corps student was as productive as a college student, used the same amount of materials and supplies, and required the same amount of supervision, we estimated the value of output of the student at $5.23 per hour or $31.38 per day.

The food service manager said that the work needed to be done. Without the Job Corps student, the college students would not get served as quickly and would need to wait longer for their food. If the Job Corps student was not available, her work would have been spread among the permanent staff and the college students already working there.

7. WELDING AT A PRIVATELY-OWNED MANUFACTURING COMPANY

Description

As a work experience assignment, welding students worked at a local company that manufactures conveyor belts. The Job Corps students welded small components, working along-side professional welders. The students worked two to three days a week, five hours per day, for about six weeks.

Estimate of the Value of Output

We estimated the value of output using the relative-productivity approach. We chose two students who were completing their work assignment at the time of the site visit. According to the students' supervisor, if Job Corps students had not been available to do the work, they would have hired a temporary welder. There are four or five temporary agencies in the area that have temporary welders. The temporary welders cost $8.50 per hour (the temporary agency pays for any benefits). The students' supervisor thought the students were as productive as a temporary worker (usually Job Corps students are more productive than the temporary workers but the chosen students were less motivated than usual). The students did not require more supervision. The temporary workers wasted *more* materials and supplies than the Job Corps students. The supervisor estimated that the temporary workers wasted about $300 *more* materials and supplies than the Job Corps students in a month, or about $1.73 per hour. Hence, we valued the output of the students on this work assignment at $10.23 ($8.50 + $1.73) per hour or $61.38 per day.

The work would have been done in the absence of the work experience assignment.

8. RENOVATING A PORCH ON A CENTER BUILDING

Description

The screened porch on a center building required renovation. Renovating the porch was chosen as a VST project because it would provide good training for the students. Students from five trades--carpentry, BAM, welding, electrician, and floor covering--worked on the project. Carpentry and BAM students: demolished the existing screened porch and the concrete steps, formed five to six risers with rebar, removed the old screens and trims, cut out the ceiling and south wall, constructed studs in three walls, replaced windows, added plasterboard, added wood behind the plasterboard, installed metal siding on exterior walls, added insulation, and painted the interior and exterior completely. The welding students installed a railing for the staircase. The electrician students replaced old conduit and installed electrical outlets, switches, overhead lights, and a thermostat. The floor covering students installed a new carpet. The work was done between April and June of 1996 and was completed at the time of the site visit.

Estimate of the Value of Output

We valued the output of the students on this project using the independent-estimate approach. We asked a local construction company to provide a bid for all the work done on the porch. Their bid was $5,828.74. In total, 756 student-hours were spent on the project (480 by the carpenters, 120 by the BAM students, 90 by the electrician students, 36 by the floor covering students, and 30 by the welding students.) The center spent $2,405.86 on materials and supplies for the project. Hence, we estimated the value of output of the students at $4.53 (($5,828.74 - $2,405.86)/756) per student-hour or $27.17 per student-day.

The VST coordinator did not believe that the project would have been done in the absence of the Job Corps students and the VST project.

9. CONSTRUCTING A BASEBALL DUGOUT AT A LOCAL HIGH SCHOOL

Description

This project was part of a miscellaneous set of small community projects. It involved the bricklaying students building a baseball dugout for a local high school. Students from the center have previously built baseball dugouts and are known in the area for doing this type of work. Bricklaying students installed the block wall above a concrete slab, installed a rebar, and grouted. Vocational students from the high school poured the concrete slab and installed the roof of the dugout. The students worked on the project for two weeks during October 1995, about six months prior to the site visit.

Estimate of the Value of Output

We used the independent-estimate approach to value the project. We asked a local construction company to give a bid for the work done by the Job Corps students and asked them to exclude from their bid the work that had been done by the high school students. Their bid was $2,946.79. The Job Corps students spent a total of 504 hours on the project. Job Corps did not provide any materials and supplies but the school district spent about $1,000 on materials and supplies. (The VST coordinator estimated the cost of materials at about $1,500. But he said the school was able to negotiate a lower price for the blocks. The outside contractor estimated the material costs at $783). Using the estimate of $1,000, the value of output was estimated at $3.86 (($2,946.79-$1,000)/504) per student-hour or $23.17 per student-day.

The work would probably have been funded at some time, but it would likely have been postponed until the funds were available.

10. CONSTRUCTING A NEW DORMITORY ON THE CENTER

Description

The center needed a new dormitory because it was not cost-effective to repair the old one. Much of the work was completed by outside contractors. A private contractor roughed in and roughed finished the dormitory. An air-conditioning/heating company did all the plumbing, heating, air-conditioning and electrical work. Another contractor installed ceiling sprinklers. As a VST project, Job Corps students did the finishing work, including the floors, interior and exterior doors, windows, and outside brick work. The project began in June 1995 and is expected to be completed in early 1998. At the time of the site visit, about 25 percent of the project had been completed. Nearly all of the construction trades worked on the dormitory.

Estimate of the Value of Output

Because the project was not completed at the time of the site visit, we decided to estimate the value of the output of this project using the relative-productivity approach. We selected two students who currently work on the project. Both students were carpentry students. The Job Corps staff said that if students had not done the work, they would have hired a journeyman carpenter. A journeyman carpenter earns $20.00 an hour and receives $4.50 in benefits. However, the students take three times as long as the professional carpenter would. Job Corps staff did not think that the students use more materials or supervision than a professional carpenter. Hence, we estimate that the value of output of the students on this project is $8.17 (($20.00 + $4.50)/3) per student-hour or $49.00 per student-day.

The center needed a new dormitory and would have requested the funds to build one even if they had not made it into a VST project. In fact, they had already received substantial funding for outside contractors to help build the dormitory. However, center staff did not know whether they would have received sufficient funding to complete the dormitory had it not been a VST project.

11. CONSTRUCTING A STORAGE BUILDING ON THE CENTER

Description

As a VST project, students constructed a storage building for equipment on the center facilities. A center facilities survey had identified the need for a storage building for petroleum-powered equipment because health and safety regulations prevented the equipment being stored in buildings that contained classrooms. The 30-foot by 40-foot building has a concrete slab foundation, insulated walls, a shingled roof, a main door, and an overhead door. Carpentry, BAM, and painting students worked on the project. The carpenters leveled the ground, made footer forms, poured the footer, formed the foundation, placed crushed stone, poured a concrete floor, finished the floor, installed a seal plate, framed walls, put up pre-fabricated rafters, installed siding, insulation, and plasterboard, shingled the roof, and installed an entry ramp. BAM students placed crushed stone, finished the floor, installed siding, and installed the electrical wiring. The painting students finished the dry wall and painted both the interior and exterior of the building. Work began on the building in September 1995 and had recently been completed at the time of the site visit.

Estimate of the Value of Output

We used the independent-estimate approach to value the project. A local contractor estimated $51,000 to construct the whole storage building. The instructors estimated that the students spent 11,640 hours on the project (about 41 percent by carpentry students, 36 percent by BAM students, and 23 percent by painting students.) The center spent $11,839.46 on materials and supplies for the project and three air-conditioning units, valued at $600 each, were donated to the center. The total value of materials and supplies used was $13,639.46. We estimated the value of output of the student at $3.21 (($51,000 - $13,639.46)/11,640) per student-hour or $19.26 per student-day.

The VST coordinator thought that this project would not have been done if it had not been a VST project.

12. CONSTRUCTING PICNIC TABLES FOR USE ON THE CENTER

Description

As part of a miscellaneous VST project, students constructed ten picnic tables to provide students with an outdoor seating and eating area. The project provided a short VST project for carpentry students. The students read plans, calculated material requirements, measured materials, cut wood, fit the pieces together, and finished the tables.

Estimate of the Value of Output

We used the independent-estimate approach to value this project. A local contractor estimated that he would charge $180 for making each picnic table, for a total bid for the whole project of $1,800. The carpentry instructor estimated that the students spent 137.5 student hours on the project (20 students spent just over one day on the project). The center paid $797.10 for materials and supplies for the tables. Hence, the value of the output is $7.29 (($1,800 - $797.10)/137.5) per student-hour or $43.76 per student-day.

The VST coordinator said that the center would have bought some picnic tables if they had not been made by the students, but the tables would have been of lower quality and they would have not purchased them until later.

13. MAINTENANCE WORK AT AN APARTMENT COMPLEX

Description

This work experience site was a local apartment complex run by a large private building-management company where students did repair and maintenance work. Students in the BAM, electrical, plumbing, tiling, or carpentry trades worked along side a member of the maintenance staff. The student we studied was in the electrical trade. He spent most of his time repairing smoke detectors at the apartment complex and making newly-installed smoke detectors in the hallways compatible with the older ones. The student spent about 100 hours at the site over a period of four weeks.

Estimate of the Value of Output

We used the relative-productivity approach to estimate the value of output of this project. We chose the student who was most recently at the work experience site to study. According to the supervisor at the work site, if the Job Corps student had not done the work, one of the full-time maintenance staff would have done it. The maintenance staff person who would have done the work earned $8.50 per hour. Based on BLS estimates of the average value of benefits as a percentage of wages and salaries for full-time private-sector blue-collar workers (48.1 percent), we estimated his benefits at $4.09 per hour and his total compensation at $12.59 per hour. The student was less productive than the maintenance worker during the first week at the site, but then was as productive as the regular maintenance staff person. Averaged over the whole period the student was at the site, the student spent about 65 minutes on the task when the maintenance staff person would have spent only 60 minutes. The student, however, did not use more materials or supplies or require more supervision than the regular maintenance staff person. Hence, we estimated the value of output of the student at $11.62 ($12.59 x 60 /65) per hour or $69.73 per day.

According to the property manager of the apartment complex, in the absence of the Job Corps students, all the work would have been done by someone else. But the work would probably have been done later.

14. RENOVATING A BATHROOM AT A SENIOR COMMUNITY CENTER

Description

During the spring of 1995, the local department of social services asked the Job Corps center for help renovating the bathrooms at a local community center used to serve meals to elderly persons. The two bathrooms were in disrepair and out of compliance with the Americans with Disabilities Act. Job Corps agreed to do all the necessary carpentry and tile work for the bathrooms. The carpentry students demolished and removed glazed block walls, removed bathroom stalls and partitioned walls, constructed frame for the walls, installed doors, and did basic clean-up. The tiling students stripped old floor tile in one bathroom, patched floor tile in the other bathroom, tiled the floors and walls, and cleaned up the site. The community center paid for all the materials and supplies. The work was conducted between October 1995 and December 1995 and was completed at the time of the site visit.

Estimate of the Value of Output

We used an independent-estimate approach to estimate the value of this project. A local contractor was asked to give an estimate of what he would charge to do the carpentry and tiling word done by the students. His estimate was $16,217.46 for the work. The instructors estimated that the carpentry students spent 784 student-hours on the bathrooms and the tiling students spent 1,296 student hours on the bathrooms. A total of 2,080 student hours were spent on the project as a whole. (The contractor estimated that the project would require 520 man-hours, about one-fourth of the man-hours spent by the students). Job Corps did not pay for any of the materials and supplies used in the project. The instructors bought the materials necessary, arranged for tool rental, and were reimbursed by the community center. The tiling instructor spent $1,893.88 on materials and tool rental. The carpentry instructors had not kept copies of all the receipts, but he estimated that he had spent between $8,000 and $10,000 on the project. (The community center would not return calls to tell us how much they had spent.) We used the mid value of the range ($9,000) to estimate the value of output. The value of output of this project was estimated at $2.56 (($16,217.46 - $10,893.88)/2,080) per student-hour or $15.36 per student-day.

The representative of the community center stated that if Job Corps students had not done the work, the work would have had to be done anyway and at the same time.

15. CONSTRUCTING A BAM SHOP AND WAREHOUSE ON THE CENTER

Description

This VST project involved constructing a building that could be used for BAM training and as a warehouse. Construction began on the building in 1994 and is expected to be completed in June 1998. For the study, we estimated the value of the output produced by the students in constructing the frame and doing the concrete work for the building. This work was completed at the time of the visit. Cement masonry students laid footings, set and tied reinforcing steel, poured cement for footings, finished work on cement, broke ties and patched holes, poured floors, and caulked the floor joints. Carpentry students laid out the work, built walls, put in headers and anchors, assembled the walls, squared the walls, and put in plywood sheeting.

Estimate of the Value of Output

We estimated the value of this project using the independent-estimate approach. A local construction company estimated $141,773 for the concrete and framing work. The instructors estimated that carpentry and plumbing students spent a total of 36,600 student hours (24,000 by cement masonry students and 12,600 by carpentry students) on this part of the project. The cost, paid for out of VST funds, for materials and supplies totaled $48,586.09, (this was lower than the estimate of the costs by the construction company of about $61,000). We estimated the value of the output produced by the students at $2.55 (($141,773.00 - $48,586.09)/36,600) per student-hour or $15.28 per student-day.

The VST coordinator said that the center needed the space, but the work probably would have been postponed if it had not been a VST program.

16. INSTALLING A SPRINKLER SYSTEM ON THE CENTER

Description

As a VST project, plumbing and BAM students installed a sprinkler system to keep grounds watered. The plumbing students determined how much pipe to lay, dug ditches for underground pipe, lay pipes, installed sprinkler heads, and installed wiring and control boxes. The BAM students helped back-fill the ditches, leveled ground, planted grass, and set sprinkler heads. This project began in August 1993 and was completed in July 1996.

Estimate of the Value of Output

We used the independent-estimate approach to estimate the value of output for this project. A local nursery estimated $27,627.50 to install a sprinkler system like the one at the center. The instructors estimated that over the three years students spent 5,700 hours on the project, nearly 80 percent of which were spent by plumbing students. Total VST funds spent on the project were $10,495.46. The value of output produced by the students was $3.01 (($27,627,50 - $10,495.46)/ 5,700) per student-hour or $18.03 per student-day.

According to the VST coordinator, if this had not been a VST project, only about one-half of the work would have been done, and it would have been postponed until a later date.

17. BUILDING IDENTIFICATION SIGNS ON THE CENTER

Description

The regional office requested students make 50 signs to identify the names and functions of buildings on center as a VST project. The signs were made of wood and mounted on a metal frame. The lettering was routed into the wood. The students also constructed 13 planters out of concrete and red brick to be installed around the base of some of the signs. The project was begun in October 1995 and completed in May 1996. Cement masonry, carpentry, bricklaying, welding, and BAM students were involved.

Estimate of the Value of Output

We valued the project using the independent-estimate approach. A local construction company bid $10,450 for constructing these signs and planters. The VST coordinator estimated that students spent 8,348 hours on the project (bricklayers spent 2,663 student hours on the project, welders spent 1,830 on the project, BAM students spent 1,588 student hours on the project, cement masons spent 1,324 student hours on the project, and carpenters spent 943 student-hours on the project). The center had spent $2,892 on the project and used $668.94 worth of donated goods. The total costs of materials and supplies was $3,560.94. The value of the student's work on the project was estimated at $0.83 (($10,450.00 - $3,561.94)/8,348) per student-hour or $4.95 per student-day.

The center built the signs because it was requested to do so by its regional office.

18. WORKING AT AN AUTO PAINT AND BODY SHOP

Description

This work experience site was an automobile paint and body shop about seven miles from the center. Auto-body repair students have gone to this work experience site for more than five years. Students swept, cleaned-up, picked-up tools, sanded, taped, repaired fenders, and performed simple auto-body repair on older cars.

Estimate of the Value of Output

We estimated the value of output from this work experience site using the relative-productivity approach. We chose two students for the study who had recently gone to the site. The owner of the shop said that if he had not used Job Corps students, he would have hired an entry-level worker at $5.00 per hour. These workers would be given paid leave, supplemental pay, and health insurance. Based on BLS estimates of the value of these benefits as 42 percent of wages and salaries of full-time, blue-collar workers in the private sector, we estimated the dollar value of these benefits to be $2.12, and the total compensation for the entry-level worker to be $7.12. The owner said that Job Corps students worked harder than the alternative worker. The work a Job Corps student did in one hour took the entry-level worker 70 minutes. The Job Corps student used about the same amount of materials and supervision as the alternative worker. Hence, we estimated the value at $8.31 ($7.12 x 70 /60) per student-hour or $49.84 per student-day.

According to the students' supervisor, the work done by the students would have been done by someone else if the students had not been available.

19. BUILDING AND STAINING A BOOKCASE

Description

This VST project was done as part of a "miscellaneous" project on center facilities. We chose the bookcase project because it was the most recent miscellaneous project completed. A teacher on center had asked for a bookcase for her classroom. The carpentry students built the plywood bookcase and the painting students stained the bookcase. It took about three days to complete. Three carpentry students and eight painting students were involved.

Estimate of the Value of Output

We used the independent-estimate approach to estimate the value of the project. We asked a general contractor to come in and estimate how much it would cost to build the bookcase. He gave an estimate of between $325 and $350 (we used the midpoint of $337.50). A total of 51 student hours were spent on the project, 39 hours by carpentry students and 12 hours by painting students. Costs for lumber and paint were $157.15. Hence, the value of output was estimated at $3.54 per student-hour (($337.50 - $157.15)/51). This is equivalent to $21.22 per student-day.

Center staff said that they would have bought a bookcase if the students had not made one, but that the teacher would have had to wait until funding had been secured.

20. RENOVATING THE PAINTING SHOP ON THE CENTER

Description

The painting program on center required more space and a more uniform shop layout for supervision and training. As a VST project, students first demolished the old painting building down to its exterior shell. Students then framed; hung plasterboard; constructed partitions for classrooms, office space, and bathrooms; hung the ceiling; installed windows; tiled walls and bathroom floors; and taped and painted walls. The students did *not* work on the plumbing, electrical work, or air-conditioning. Painting, carpentry, and cement masonry students were involved in the project, which was begun in March 1995 and nearly completed at the time of the site visit in June 1996.

Estimate of the Value of Output

We estimated the value of the project using the independent-estimate approach. A local general contractor bid $55,496 for the entire project, including the plumbing, electrical work, and air-conditioning. After removing the charges for the activities not conducted by the students, the bid was $32,946. The VST coordinator estimated that 3,792 student-hours were spent on the project. The costs of materials and supplies were $17,200, all paid for out of VST funds. We estimated a value of $4.15 (($32,946 - $17,200)/3,792) per student-hour or $24.91 per student-day.

According to the VST coordinator, none of the work would have been done in the absence of VST projects.

21. REMODELING AN INSTRUCTIONAL BUILDING ON THE CENTER

Description

The facilities survey determined that the building used for business/clerical instruction and the occupation exploration program needed remodeling. The building was in poor repair and the high ceiling and large windows resulted in high heating bills. This VST project began in 1986 and was expected to be finished at the end of 1997. It involved all the construction trades on center.

We chose to value one room in the building that was nearly finished and was worked on during the reference months. The room, designed to be the vocational education office, included a reception area, a secretary's office, a vocational manager's office, an instructor's office, and a bathroom. Work had begun on this room in spring 1996 and was expected to be completed about one month after our visit. Renovations included removing existing windows and replacing thermal units, installing a suspended ceiling, replacing wood doors with steel doors, replacing light fixtures and electrical switches and receptacles, finishing walls with dry vit, painting all doors and trim, replacing existing floor covering (not finished at the time of the site visit), covering upper walls with wallpaper (not finished at the time of the site visit), and replacing the toilet in the bathroom. Plastering, electrical, carpentry, BAM, floor covering, painting, bricklaying, and plumbing students were involved in this VST project.

Estimate of the Value of Output

We used the independent-estimate approach to value this project as completed at the time of the visit. A local contractor estimated $13,840 for the project. The VST coordinator estimated that a total of 6,110 student hours had been spent on the project. Carpentry students accounted for about one-third of these hours; plastering students accounted for about one-fourth of these hours. Total costs of materials and supplies for remodeling the room were $6,530, all paid for out of VST funds. We estimated the value of the output produced by the students on this room as $1.20 (($13,840 - $6,530)/6,110) per student-hour or $7.18 per student-day.

The remodeling of this room was necessary for the center. However, for training purposes, students were doing a lot of time-consuming plastering. The contractor said he would have just taped and spackled over gypsum board instead. This would have lowered his bid to $12,640.

22. REFURBISHING THE ELECTRICAL SHOP ON THE CENTER

Description

In 1995, a new addition was added to the electrical shop and the old electrical shop building was refurbished. As a VST project, the students refurbished and relocated the instructor's office and restroom. We valued only the work on the instructor's office because it had been completed before our site visit to the center. The work involved removing an old bathroom, relaying the floor, constructing three walls with three windows and a door, and plastering and painting the walls. Plumbing, carpentry, BAM, electrical, painting, floor covering, cement masonry, and bricklaying students were involved.

Estimate of the Value of Output

We used the independent-estimate approach to estimating the value of this project. A local construction company estimated $13,450 for the work on the instructor's office. A total of 5,367 student-hours had been spent on the project. More than 80 percent of the work was completed by students in the plumbing, carpentry, BAM, and electrical trades. Students in floor covering, cement masonry, and bricklaying accounted for the balance of hours. The center had spent $5,800 out of VST funds on the project. We estimated the value of the output at $1.43 (($13,450-$5,800)/5,367) per student-hour or $8.55 per student-day.

According to the VST coordinator, this work was necessary and would have been done even in the absence of VST projects.

23. PROVIDING NURSING ASSISTANCE AT A LOCAL CONVALESCENT HOME

Description

A work experience assignment at a local convalescent home was available for students who had completed their certified nursing assistant course and passed the state examination. Tasks included bathing and feeding patients and performing other nursing duties.

Estimate of the Value of Output

We estimated the value of output using the relative-productivity approach. We chose for the study the student who had most recently been on the work experience assignment at the time of the site visit. Staff at the convalescent home said that the Job Corps student performed tasks similar to those of a newly hired certified nursing assistant. A newly hired certified nursing assistant earns $5.40 an hour and has benefits worth about 20 percent of the hourly wage, for a total compensation of $6.53. The student was about as productive as a new hire and did not use more materials and supplies or require more supervision than a new hire. The value of the output of the student was $6.53 per hour or $39.18 per day.

The convalescent home staff felt that, although there were some problems with the student's performance, there were no more problems that with an average new hire. In fact, the student was eventually hired. The tasks performed by the students would have been performed by someone else if the Job Corps student had not done them.

24. ADDING TO THE NONRESIDENTIAL BUILDING ON THE CENTER

Description

The center's facility survey indicated that the center had an inadequate lounge for nonresidential students and inadequate space for the orientation program. As a VST project, students constructed a one-story brick-veneer building around a preexisting modular building. The students did all the work on the building except for the heating, air conditioning, and carpeting. Carpentry, bricklaying, painting, and BAM students worked on the project. The carpentry students did the site layout, framed the floors, walls, and roof, and worked on the roofing, siding, dry wall, door frames, doors, flooring, and windows. The bricklayers worked on the footing, the foundation, steps, porch, and the brick veneer. The painters did all the staining, texturing, and painting. BAM students did the electrical wiring, plumbing, and dry wall. The work began in April 1995 and was completed in October 1995, prior to the site visit.

Estimate of the Value of Output

We estimated the value of the project using the independent-estimate approach. A local construction company estimated $97,558 to do the same work as the students had done. The cost of materials and supplies was $22,436, paid out of VST funds. The VST coordinator estimated that carpentry students spent 8,640 student-hours on the project, bricklaying students spent 7,560 student-hours on the project, painting students spent 2,880 student-hours on the project, and BAM students spent 1,920 student-hours on the project. In total, 21,000 student-hours were spent on the project. We estimated the value added by the students at $3.58 (($97,558 - $22,436) / 21,000) per student-hour or $21.46 per student-day.

The VST coordinator believed that the addition would have been built even if it had not been a VST project, but it would probably have been built at a later date.

25. ADDING TO THE CENTER'S ADMINISTRATIVE BUILDING

Description

The center needed more space for its administration staff. As part of a VST project, students built an addition onto the existing administrative building. Students poured footers, constructed the wood frame, and installed siding. Students also did dry-in work, most of the electrical work, and interior and exterior painting. They contracted out the installation of the air conditioning, phones, fire-alarm system and hook-ups for the computers. The project began in July 1994 and was almost completed at the time of the center visit in August 1996. Carpentry, BAM, cement masonry, and painting students were involved. The carpenters did the layout and framing and decking. BAM students did the plumbing and electrical work. The cement masons prepared the foundation and the painters did the drywall and painted the building. At the time of the visits, about 98 percent of the work was completed.

Estimate of the Value of Output

We used the independent-estimate approach to value the output of the project. A local construction company bid the work at $141,948. The VST coordinator estimated the number of student hours spent on the project at 19,589. The VST coordinator reported costs of $26,442. This estimate of costs was lower than the cost estimate reported on the VST plans (submitted to the regional office) and the costs for materials and supplies provided by the construction company because the center realized economies of scale by buying in bulk. Using the estimate of costs provided by the VST coordinator yields an estimate of the value of the output of the students of $5.90 (($141,948 - $26,442)/19,589) per student-hour or $35.38 per student-day.

Although the center needed the space, the VST coordinator did not think that the addition would have been built if it had not been a VST project.

26. PERFORMING CLERICAL WORK AT A LOCAL COMMUNITY COLLEGE

Description

As a work experience assignment, students performed clerical tasks at a local community college. The clerical students greeted the public at the college, answered telephones, filed, copied and collated, prepared bulk mailings, operated the fax machine, and completed some word processing. Each student worked three days a week for about a month.

Estimate of the Value of Output

We valued the output using the relative-productivity approach. We estimated the value of output of one student who worked on the assignment most recently prior to the site visit. According to the supervisor at the work experience site, if the Job Corps student had not done the work, a secretary would have done the work. The secretary would earn $5.00 an hour and would receive only legally-required benefits. Using BLS estimates of the average value of legally-required benefits as a percent of wages and salaries for white-collar workers in the state and local government (8.5 percent), we estimated the hourly compensation for the alternative worker at $5.41. The student worked about as fast as an alternative worker and did not use more materials and supplies. However, her supervisor estimated that she required about 30 minutes *less* supervision per day than the alternative worker. The supervisor's hourly wage was $8.65 and she received paid leave, health insurance, retirement and savings benefits, and legally-required benefits. Estimating the value of these benefits using BLS data, we estimate that her total hourly compensation was $12.04. A reduction of 30 minutes of supervision per day would have saved the community college about $78.26 (13 x 0.5 x $12.04) over the 13-day period. As the Job Corps student worked 84.5 hours at the college, the value of output of the student was $6.34 ($5.41 + ($78.26/84.5)) per student-hour or $38.02 per student-day.

According to the student's supervisor, if the student had not done the work, someone else would have had to perform the work at the same time.

27. BUILDING A CONCRETE PAD AND SHELTER ON THE CENTER

Description

The center needed a storage area for spray and sand-blasting equipment and landscaping supplies such as mulch, soil, and sand. Students built a shelter with a roof, double doors, a concrete slab foundation, and four bays for soil or sand material. The project took about four months to complete and it had been completed just before the site visit. Landscaping students graded the soil, added a compacting pad, and leveled ground after the concrete slab was in place. BAM students formed the pad, excavated the footing, added footing reinforcement, finished a concrete grooved slab, laid out block walls, installed form work for tie beams, added the beam reinforcements, placed concrete for tie beams, installed a door for the storage room, built the roof framing, installed shingles, stuccoed the interior and exterior of the building, and added electrical wiring in the wall.

Estimate of the Value of Output

We valued the project using the independent-estimate approach. A local construction company estimated $17,792 to build the concrete pad and shelter. The VST coordinator and landscaping instructor estimated that BAM students spent about 2,304 student-hours on the project (24 students over about 16 days) and the landscaping students spent about 504 student-hours on the project (12 student over about 7 days), for a total of 2,808 hours. The center spent $6,858 on materials and supplies, a little less than the bid for materials from the local construction company. We estimated the value of output per student hour as $3.89 (($17,792 - $6,858)/2,808) per student-hour or $23.36 per student-day.

According to the VST coordinator, none of the work would have been done if had not been a VST project.

28. BUILDING A SHADE HOUSE ON THE CENTER

Description

The center needed a shade house to store plant material grown by the students. It was hoped that this would save funds by allowing students to grow their own materials for landscaping the center rather than purchasing the materials from vendors. Landscaping and BAM students built the shade house as a VST project between March and August 1996. It was completed by the time of the site visit. Landscaping students leveled the ground, compacted the soil, assembled the framework for the house, installed the canvas top roof, and installed the sprinkler option. BAM students assisted in the layout, set poles, built a planting containment area, built a wood framework, built a wood-bench system, and installed a door.

Estimate of the Value of Output

We used the independent-estimate approach to value the project. A local construction company estimated $15,929 for the work, $6,946.50 of which was for materials and $8,982.50 was for labor. The VST coordinator and landscaping instructor estimated that BAM students spent 1,683 student hours on the project and the landscaping students spent 1,080 student hours on the project, for a total of 2,763 student hours. The center spent $7,098.05 on materials out of VST funds -- about the same as the estimate of material costs provided by the construction company. We estimated the value of the output per student-hour of the project to be $3.20 (($15,929 - $7,098)/2,763) or $19.18 per student-day.

According to the VST coordinator, none of the work would have been done if it had not been a VST project.

29. MAKING CIGARETTE BUTT CONTAINERS FOR USE ON THE CENTER

Description

As a VST project, the welding class made eight cigarette butt containers to be used on center. For each container, they cut a ground base, cut the pipe exterior, welded the pipe to the base, cut and shaped the top tray, welded the tray to the pipe, and painted each container. The work took place in August and September 1996, about one month prior to the site visit.

Estimate of the Value of Output

We used the independent-estimate approach to value the project. None of the welders near the center would provide us an estimate--they said the job was too small. From a sketch and measurements of the cigarette butt containers, a small welding firm in Houston estimated $426.09 for eight containers, or about $53 per container. The welding instructor estimated that 10 students worked a total of 350 hours on the project. The center spent $142.03 for materials for the project. We estimated the value of output at $0.81 (($426.09 - 142.03)/350) per student-hour or $4.87 per student-day.

In the absence of VST projects, the center would have purchased some containers for cigarette butts, most likely barrels. Each barrel would cost about $52. If we used the price of barrels instead of the price of containers, the value of output would be only slightly lower.

30. BUILDING A BRICK WALL ON THE CENTER

Description

As a VST project, students built a 2.5-foot brick wall around the residential-living building on center. The wall was intended to help drain the area, thereby ameliorating a mud problem around the residential-living building. The project was begun and finished in September 1996, a month prior to the site visit. Bricklaying and BAM students worked on the project.

Estimate of the Value of Output

We used the independent-estimate approach to value the project. A local contractor bid $2,189 for the project. The vocational manager estimated that students spent 1,260 student hours on the project (bricklayers worked 980 hours and BAM students worked 280 hours). The total cost of materials and supplies was $406, all from VST funds. We estimated that the value to be $1.42 (($2,189 - $406)/1,260) per student-hour or $8.49 per student-day.

The vocational manager did not think that all the work would have been done in the absence of VST projects. He thought that perhaps half of the work would have prevented the drainage problem.

31. REHABILITATING THE MATH AREA ON THE CENTER

Description

The center needed more math classroom space, so as a VST project, students divided a large classroom into four smaller areas. Work began in July 1995 and ended in November 1995. BAM, carpentry, and painting students worked on the project. BAM students removed carpet, chipped out floor tile and removed adhesive from the cement floor, removed and replaced ceiling tile, removed electrical conduit, installed new lighting and power, and installed a carpet. Carpentry students removed interior walls, shelving, doors, and old paneling, built three partition walls, repaired old plasterboard, hung six doors and set door jambs, and built shelving. The painting students taped and finished drywall, and primed and painted walls, trims, doors, closets, and shelves.

Estimate of the Value of Output

We estimated the value of the work conducted on the project using the independent-estimate approach. A local construction company estimated $22,239.64 for the same work as the students. The VST instructors estimated that the students spent 3,849 hours on the project (1,737 hours by the BAM students, 1,320 by the carpentry students, and 792 hours by the painting students). The center spent $9,992.62 on materials and supplies for the project out of VST funds. We estimated the value of the output of the students at $3.18 (($22,239.64 - $9,992.62)/3,849) per student-hour or $19.09 per student-day.

The center needed the additional space. If the project had not been done as a VST project, the VST coordinator thought that the center would have paid up to $20,000 for a private contractor to conduct the same work.

32. REHABILITATING THE BRICKLAYERS' CLASSROOM ON THE CENTER

Description

As a VST project, bricklaying, BAM, carpentry, and plastering students worked on rehabilitating the bricklayers' classroom. The project improved the appearance and convenience of the training room. The project began in November 1995 and was still in progress at the time of the site visit at the end of February 1996. Bricklaying students built walls (including a bearing wall and a block and clay brick wall), built a display case, installed a wall with three doors with a masonry beam on top, and laid a four-by-four tile deco wall, and created a storage area. BAM students disconnected electrical wiring and removed the old conduit, installed new power and light circuits, and installed circuitry for lighting in the classroom, storage room, and locker room. Carpentry students built 20 lockers; removed the existing ceiling, doors, and windows; and initiated reconstruction activities, such as setting new door jambs, installing exterior doors, and reframing the ceiling with bracing. The plastering students prepped a wall with a bonding agent and plastered a wall.

Estimate of the Value of Output

We valued the portion of the students' work on the classroom that had been completed at the time of the site visit using the independent-estimate approach. A local construction company estimated $33,562.85 for the work. The VST instructors estimated that a total of 2,642 student hours had been spent on the project (1,600 by the bricklaying students, 156 by the BAM students, 806 by the carpenters, and 80 by the plasterers). The center spent $5,243.89 of VST funds on materials for the project. Hence, we estimated the value of output at $10.72 (($33,562.85 - $5,243.89)/2,642) per student-hour or $64.31 per student day.

The VST coordinator thought that if the project had not been done as a VST project, it would probably not have been done. It was chosen primarily because it provided good training opportunities. In addition, some of the brick work done for the project was particularly intricate and selected for training purposes. The contractor estimated that their bid would have been five percent lower if this brickwork had not been done.

33. REPLACING A DOOR TO THE TRANSPORTATION SHOP ON THE CENTER

Description

The door to the transportation shop on center had been damaged by trucks. As a VST project, BAM students replaced the door to the transportation deck. At the time of the site visit, students were working on extending the deck. The project began in January 1996 and was not finished at the time of the site visit in May 1996. The students removed the old wiring, prepared the opening, removed the door jamb and back rebar, assembled and installed a new door, and rewired the alarm and emergency exit signs above the door. At the time of the site visit, students still needed to excavate the ground, install a concrete block for a new deck, and move the existing power and phone pole and reattach it to the deck.

Estimate of the Value of Output

We used the independent-estimate approach to value the project. A local construction company found it difficult to value the work as completed at the time but estimated $17,300 for the finished project. The VST coordinator and instructors said that the students had already worked 6,600 hours on the project and would work another 4,026 hours, for a total of 10,626 hours. So far, the center had spent $7,448.93 on the project and expected to spend a total of $10,000. We estimated the value of output to be $0.69 ((17,300 - 10,000)/10,626) per student-hour or $4.12 per student-day.

The door had needed to be replaced for at least six years. The VST coordinator thought that it would have been replaced eventually, although probably not that year.

34. REPLACING STORM WINDOWS ON A CENTER BUILDING

Description

A facilities utilization survey of the center recommended that the windows on a center building be replaced. The center adopted this as a VST project for carpentry students. However, to increase the training value of the project, students custom-made windows instead of buying them. Students built grooves in the window frames, and installed plexiglass, sealed and caulked the plexiglass, painted the window frames, and installed the windows in the building. The project was completed at the time of the site visit.

Estimate of the Value of Output

We used the independent-estimate approach to value the work done on the project. A local construction company estimated $4,250 for the project. The VST coordinator and carpentry instructor estimated that the students spent 2,370.5 hours on the project. The center spent $3,155.17 on the project from VST funds. We estimated the value to be $0.46 (($4,250 - $3,155.17)/2,370.5) per student-hour or $2.77 per student-day.

The windows needed to be repaired or replaced. The VST coordinator said that he would have expected funding for the windows even if it had not been a VST project. He said that they would have replaced rather than repaired the windows if it had not been a VST project, as this would be less costly. However, according to the representative of a local construction company who made the estimate for the study, replacing the windows would cost more than repairing them.

35. BUILDING FURNITURE FOR A PATIO ON THE CENTER

Description

As a VST project, students constructed a patio outside the culinary arts room. It was designed to resemble an outdoor cafe and will be used to serve people food from the culinary arts room. We valued the benches and planters for the patio. The planters will be used to grow herbs for the culinary arts program. BAM students completed this part of the project. The project was begun in September 1995 and completed in February 1996, before the site visit.

Estimate of the Value of Output

We estimated the value of this project using the independent-estimate approach. If the students had not done the work, planters and benches would have been purchased. We took photographs and measurements of the furniture to a nursery. The store quoted $525.82 for the furniture. The center spent $512.37 out of VST funds on materials and supplies for the furniture. Seventeen BAM students worked four hours a day for ten days for a total of 680 student hours. Hence, we estimated the value of output of this project at only 2 cents (($525.82 - $512.37)/680) per student-hour or 12 cents per student-day.

According to the VST coordinator, the furniture for the patio improved the appearance of the center, but it was not necessary. The VST coordinator thought that the center would have paid about $1,000 for the furniture, substantially more than the price quoted by the store for similar furniture.

36. LANDSCAPING AT A LOCAL APARTMENT COMPLEX

Description

As a work experience assignment, students do landscaping work at a local privately-owned apartment complex about a 20-minute drive from the center. Students planted shrubs, prepared soil, selected plants, cleared leaves, spread mulch, trimmed, thinned plants, irrigated the area, and maintained tools.

Estimate of the Value of Output

We estimated the value of output of this project using the relative-productivity approach. We chose two students who had recently finished this work experience assignment. In the absence of the Job Corps students, the apartment complex would probably have hired a temporary worker to do the landscaping work. The temporary worker would cost the complex $7.00 per hour (benefits are paid by the temporary agency). According to the supervisor at the site, the first student was about as productive as a temporary worker but the second student was much *more* productive than a temporary worker. It was estimated that the apartment complex would need to hire a temporary worker for one hour to do the work that the second student did in 42.5 minutes. Students used the same materials and supplies and needed the same supervision as the temporary worker. The first student worked a total of 210 hours. The cost of hiring a temporary worker to do the work of the first student is $1,470 ($7.00 x 210). The second student worked a total of 140 hours. The cost of hiring a temporary worker to do the work of the second student is $1,384 ($7.00 x140 x 60/42.5). Hence, we estimated the value of output of the two students as $8.15 (($1,470 + $1,384)/(210 + 140)) per student-hour or $48.93 per student-day.

The supervisor at the work experience site said that if the work had not been done by Job Corps students, it would have been done by someone else (probably a temporary worker).

37. BUILDING AN ENTRANCE TO A DORMITORY ON THE CENTER

Description

As a VST project, students built an entrance to a dormitory on the center. A new entrance was needed because moisture was coming into the building. The work began the third week of June 1996 and was expected to be finished in November 1996. It involved students in five trades: carpentry, cement masonry, welding, glazing, and electrician. The carpenters excavated the area for the entrance. The cement masons placed and finished the base form and foundation. The welders manufactured the steel beams for the entrance. The glazers installed steel beams and posts. The electricians laid the conduit and brought conduit to an electrical light fixture.

Estimate of the Value of Output

We estimated the work done on this project using the independent-estimate approach. We considered only the work that had been completed at the time of the site visit (the third week of September 1996). A local construction company estimated $39,361 for the project. The center spent $2,219 out of VST funds on the project and $1,450 out of other funds, for a total of $3,669. This is lower than the material costs of $8,814 estimated by the contractor. The VST coordinator estimated that a total of 315 student days or 1,890 student hours had been spent on the project. We estimated the value to be $18.88 (($39,361 - $3,669)/1,890) per student-hour or $113.31 per student-day.

The VST coordinator did not think the work would have been done if it had not been a VST project.

38. PERFORMING CLERICAL WORK AT AN EMPLOYMENT SERVICE OFFICE

Description

As a work experience assignment, students performed general office duties at the state employment service office. Students filed, cleaned up the lobby, watered plants, photocopied, collated, shredded confidential information, and stuffed envelopes. The office was about 3.5 miles from the center.

Estimate of the Value of Output

We estimated the value of the work students did on this work experience assignment using the relative-productivity approach. We chose a student who had most recently completed the assignment. The student's supervisor said that if the student had not done the work, the office coordinator would do it. The office coordinator was paid $7.00 per hour. Using the BLS estimates of benefits as 39.9 percent of wages and salaries, we estimated the value of his benefits to be $2.79 per hour for a cost of $9.79 per hour. The student was slower than most of the Job Corps students at the site. His supervisor estimated that he would need 90 minutes to do the work completed by the altemative worker in 60 minutes. He also required about 30 minutes more supervision per (5.5 hour) day than the office coordinator. His supervisor earned $11.00 per hour with benefits of $4.39 per hour. The cost of the additional supervision per hour worked by the student is $1.40 (($11.00 + $4.39) x 0.5 / 5.5). The value of the output of the student is $5.13 (($9.79 x 60/90) - $1.40) per student-hour or $30.76 per student-day.

According to the student's supervisor, the work needed to be done. The office coordinator would have done it in the absence of the work experience student.

39. WELDING AT A PRIVATE MANUFACTURING COMPANY

Description

As a work experience assignment, welding students weld, grind, cut, and study blueprints at a local manufacturing company. To be accepted for this assignment, students must be within 80 percent of completing their trade and have a GED or high-school diploma.

Estimate of the Value of Output

We used the relative-productivity approach to estimate the value of the output of the student. We chose a student who worked there most recently prior to the site visit. The student's supervisor said that a temporary worker would have done the work of the student. The temporary worker would earn $6.00 per hour (benefits paid by the temporary agency). The student' supervisor said that the student was about as productive, used the same amount of materials and supplies, and required the same amount of supervision as the temporary worker. We estimated the value of output of this project at $6.00 per student-hour or $36.00 per student-day.

According to the owner of the company, the work would have been done, by someone else if the Job Corps students had not been available.

40. BUILDING STUDENT LOCKERS ON THE CENTER

Description

As a VST project, students built 18 wall lockers for use by students on the center. The lockers are 41 inches by 26.5 inches and have a solid-core door. Carpentry and painting students were involved. The carpentry students cut the materials and made the lockers and put the hardware on the lockers. The painting students stained and finished the lockers. Fourteen students took about two months to complete the project. The project had been completed at the time of the site visit.

Estimate of the Value of Output

We used an independent-estimate approach to value the output of the students. A local construction company estimated $886 per unit for the 18 student lockers, or $15,948. The center spent $5,792 out of VST funds for the materials and supplies for the project. (This was lower than the construction company's estimate.) Carpentry students spent 693 student hours on the project, and painting students spent about 605 student hours on the project, for a total of 1, 298 student hours. Hence, we estimate the value of output of this project as $7.82 (($15,948 - $5,792)/1,298) per student-hour or $46.95 per student-day.

According to the VST coordinator, the center would have purchased lockers if the students had not constructed them as a VST project.

41. CONDUCTING TWO MISCELLANEOUS COMMUNITY PROJECTS

Description

At one center, the VST project chosen consisted of "miscellaneous community projects." During the reference period, students worked on four projects. Two of the projects, both of which involved construction of restrooms, could not be valued because we could not interview the students' supervisors. We studied the construction and removal of scaffolding for an arts festival and the welding of 150 plant pallets for the Forest Service. These two projects accounted for about 60 percent of the student hours spent on the miscellaneous community projects during the reference period. The scaffolding project accounted for about 8 percent and the plant-pellet project accounted for about 52 percent of student hours.

Estimate of the Value of Output

We estimated the value of output produced by the student on each project. The students produced output worth $5.71 per student hour on the scaffolding project and output worth $10.57 per student hour on the plant-pellet project. The weighted average of the value produced per student hour is $9.95 per student-hour or $59.70 per student-day.

Scaffolding Project. We estimated the value of the output produced in the scaffolding project using the relative-productivity approach. We chose a student randomly who worked on the project during the reference period. His supervisor said that a professional carpenter with scaffolding experience would have been hired if Job Corps students had not been available. The hourly wage rate of a professional carpenter is $16.50 with benefits of $3.00 per hour, for compensation of $19.50 per hour. The carpenter would take about one-third of the time taken by the Job Corps student to do the same work. The student also used more materials, the cost of which was estimated at 79 cents per student-hour. The student also required more supervision than the professional, but the additional supervision was provided by Job Corps instructors. We estimated the value of output of this project at $5.71 (($19.50/3) - 0.79) per student-hour. The work was necessary for the festival. If the festival had been required to pay professional carpenters for the scaffolding, it would have placed the festival in jeopardy.

Plant Pallet Project. We used the independent-estimate approach to value the plant-pallet project. The company that was providing the Forest Service with the materials for the plant pallets (valued at $23,524) would have charged $250 per pallet (or $37,500 for 150 pallets) for the *labor* to construct the plant pallets. In total, the students spent 3,549 student hours constructing the pallets. We estimated the value of output of the students to be $10.57 ($37,500/3,549) per hour. The Forest Service used all the pallets. However, if they had needed to pay for labor to make the pallets, they would have bought 100 pallets instead of 150.

42. WELDING AT A PRIVATE MANUFACTURING COMPANY

Description

Welding students from the center performed mig welding, built welding kits for stores, punched, painted, and performed general shop clean-up for a for-profit private manufacturing company about 20 miles from the center.

Estimate of the Value of Output

We estimated the value of output produced by the students during this work experience assignment using the relative-productivity approach. We selected the student who had most recently completed this assignment at the time of the site visit. If the student had not been available for the work, the company would most likely have hired a temporary worker. The company would have paid $8.50 an hour for a temporary worker. The student was as productive as a temporary worker (the supervisor reported that Job Corps students are usually more productive than temporary workers, but the chosen student was not), used the same amount of materials, and required the same amount of supervision. We estimated the value of the output of this project at $8.50 per student-hour or $51.00 per student-day.

If a Job Corps student had not been available, all the work would have been done by a temporary worker.

43. CONSTRUCTING THE CARPENTRY SHOP ROOF ON THE CENTER

Description

A new carpentry shop was constructed on the center. As a VST project, students constructed the roof. The project began in September 1995, stopped over the winter of 1995/1996 and began again in May 1996. The site visit was in September 1996, two months before the roof was finished. Only the more advanced carpentry students worked on this project. It involved putting up roof tresses, putting up the sleeper system, operating a crane, installing an insulation/vapor barrier, and doing the trim work.

Estimate of the Value of Output

We used an independent-estimate approach to value the work of the students on this project. A local construction company bid was $67,270 for the roof. The center had already purchased all the materials for the roof. They spent a total of $31,637.52--$27,990.01 out of VST funds and $3,647.51 out of C&R funds. (This is somewhat lower than the bid from the construction company for materials of $39,016.) Before the site visit, 2,221 student hours had been spent on the roof. We called the center again after the roof was finished and the VST coordinator reported that an additional 200 student-hours had been spent completing the roof after the visit. We estimated the value at $14.72 (($67,270 - $31, 637.52)/2,421) per student-hour or $88.31 per student-day.

The VST coordinator thought that the carpentry shop would have been built even if students had not been available to do the work.

44. PROVIDING PATIENT CARE AT A LOCAL VETERAN AFFAIRS HOSPITAL

Description

Nursing students from the center cared for veterans with dementia at a local Veteran Affairs hospital. Students made beds, gave baths, fed patients, took patients for walks, and talked with patients.

Estimate of the Value of Output

We used the relative-productivity approach to value the output. We chose a student who had just completed her six-week work experience assignment at the hospital. The most likely alternative worker would be a certified nursing assistant. The nursing assistants at the hospital earned $8.67 per hour and received full benefits estimated at $4.89. The total cost of a nursing assistant working one hour is $13.56. The student's supervisor said that the student was as productive as a regular nursing assistant, used the same amount of materials and supplies, and required the same amount of supervision. We estimated that the value of output of the student was $13.56 per hour or $81.36 per day.

If the work had not been done by a Job Corps student, the work would have been done by someone else at the hospital.

APPENDIX C

STANDARD ERRORS OF ESTIMATES

This report presents estimates of the total number of student-days spent on work projects, the average value of output created per student-day spent on work projects, and the total value of the output created by students during work projects. These estimates are called "point" estimates. This appendix presents standard errors for these point estimates. As its name implies, a standard error is an estimate of the error in a point estimate and is a measure of our uncertainty about the estimate. Standard errors can be used to estimate "confidence intervals" that give a range of possible values. A "95-percent" confidence interval extends from two standard errors below the point estimate to two standard errors above the point estimate. Thus, when we estimate that the number of student-days spent on work projects is 1,052,100 and the standard error for this estimate is 105,910 (see Table C.1), the 95 percent confidence interval runs from 1,052,100 - 2 x 105,910 to 1,052,100 + 2 x 105,910, or from 840,280 to 1,263,920. We are 95-percent confident that the true number of student-days spent on work projects lies between 840,280 and 1,263,920.

The standard errors reflect uncertainty due to the sampling of centers, reference months, and projects. If we had studied all projects that were worked on in all Job Corps centers in one year, the standard error of the estimates would be zero. The standard errors do not reflect the uncertainty surrounding outside contractor's estimates of the supply price, center staff's estimates of student-days worked on the project and materials costs used on the project, or estimates of the relative productivity of students made by their supervisors at work experience sites.

The standard errors presented in this appendix were calculated using SUDAAN, a computer software package that calculates standard errors based on the user's description of the sample design.

Table C.1 presents estimates of the standard errors of the total number of student-days spent on work projects, Table C.2 presents estimates of the standard errors of the average value of output produced per student-day spent on non-center-serving projects, and Table C.3 presents estimates of the total value of output produced annually by Job Corps students while working on non-center-serving projects.

TABLE C.1

ESTIMATES OF THE NUMBER OF STUDENT-DAYS SPENT
ON WORK PROJECTS IN ONE YEAR
(Weighted)

	All Work Projects		Work Projects That Are Not Center-Serving	
Type of Project	Total Number of Days	Number of Days Per Student-Year	Total Number of Days	Number of Days Per Student-Year
WE	221,343	6	189,054	6
	(57,199)[a]	(2)	(53,716)	(2)
VST	830,757	24	547,280	16
	(107,141)	(3)	(65,094)	(2)
All	1,052,100	31	736,334	21
	(105,910)	(3)	(64,505)	(2)

[a]Standard errors are in parentheses.

TABLE C.2

ESTIMATES OF THE AVERAGE VALUE OF OUTPUT PRODUCED
PER STUDENT-DAY SPENT ON NON-CENTER-SERVING PROJECTS
(Weighted)

Type of Project	Average Value Per Student-Day	Average Value Per Student-Hour
WE	$42.06 ($3.12)[a]	$7.01 ($0.52)
VST	$32.94 ($5.16)	$5.49 ($0.86)
All	$39.00 ($2.64)	$6.50 ($0.44)

[a]Standard errors are in parentheses.

TABLE C.3

ESTIMATES OF THE VALUE OF OUTPUT PRODUCED ANNUALLY BY JOB CORPS STUDENTS WHILE WORKING ON NON-CENTER-SERVING PROJECTS
(Weighted)

Type of Project	Total Value of Output	Value Per Student-Year
WE	$9.2 million ($1.4 million)[a]	$266.85 ($40.33)
VST	$17.9 million ($3.0 million)	$521.95 ($88.17)
All	$27.1 million ($4.0 million)	$788.79 ($117.32)

[a]Standard errors are in parentheses.

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